THE LIVING AGE.

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ROME—1859.

BY JOHN G. WHITTIER.

Off with hats, down with knees, shout your vivas like mad!
Here's the pope in his holiday righteousness clad,
From shorn crown to toe-nail kiss-worn to the quick,
Of sainthood in purple the pattern and pick,
Who the *rôle* of the priest and the soldier unites,
And praying like Aaron, like Joshua fights!

What's this squeak of the fife and this batter of drum?
Lo! the Swiss of the Church from Perugia come—
The militant angels, whose sabres drive home
To the hearts of the malcontents cursed and abhorred
The good Father's missives, and "thus saith the Lord!"
And lend to his logic the point of the sword!

O maids of Etruria, gazing forlorn
O'er dark Thrasymenus, dishevelled and torn!
O fathers, who pluck at your gray beards for shame,
O mothers, struck dumb by a woe without name!
Well ye know how the Holy Church blesses and saves,
And its tender compassion of prisons and graves!

Stand aside, men of Rome! Here's a hangman-faced Swiss—
(A blessing for him surely can't go amiss)—
Would kneel to God's vicar his slipper to kiss.
Fit son of such father—He's blest beyond doubt;
But there's blood on his hands which will never wash out
Though Peter himself held the baptismal spout!

Make way for the next. Here's another sweet son!
What's this mastiff-jawed rascal in epaulettes done?
Hush! stoop your ear down; let me whisper the word,
He spitted a heretic babe on his sword!
And its mother?—don't name her,—these humors of war
The Church, Satan helping, must pardon him for!

Hist! Here's the last-named, in a cardinal's hat,
With the heart of a wolf and the stealth of a cat,
(As if Judas and Herod together were rolled)—
Who keeps, all as one the pope's conscience and gold,
Mounts guard on the altar and pilfers from thence,
And flatters St. Peter while stealing his pence?

Who doubts Antonelli? Have miracles ceased
When stabbers say mass, and Barabbas is priest?

When the Church eats and drinks, at its mystical board,
The true flesh and blood carved and shed by its sword—
When its martyr, unsinged, claps the crown on his head,
And roasts, as his proxy, his neighbor instead!

There! the bells jow and jangle the same blessed way
That they did when they rung for Bartholomew's day—
Hark! the tallow-faced monsters, nor women, nor boys,
Vex the air with a shrill, sexless horror of noise,
The mass-candles gutter—all round, without stint,
The incense-pot swings, with a taint of blood in't!

Holy pope! Blessed cardinals! who dares complain
Of state or of church where the saints only reign—
Where the faithful are loaded with honors and dole
For deeds that would damn any heretic's soul;
And robbers, turned sbirri, have nothing to fear,
But dodge hell hereafter, by making it here!

—*Independent, October* 27.

"AT THE LAST."

Man goeth forth unto his work, and to his labor, until the evening.—Ps. 104: 23.

The stream is calmest when it nears the tide,
And flowers are sweetest at the eventide,
And birds most musical at close of day,
And saints divinest when they pass away.

Morning is lovely, but a holier charm
Lies folded close in evening's robe of balm;
And weary man must ever love her best,
For morning calls to toil, but night brings rest.

She comes from Heaven, and on her wings doth bear
A holy fragrance like the breath of prayer;
Footsteps of angels follow in her trace,
To shut the weary eyes of Day in peace.

All things are hushed before her, as she throws
O'er earth and sky her mantle of repose;
There is a calm, a beauty, and a power,
That morning knows not, in the evening hour.

"Until the evening" we must weep and toil,
Plough life's stern furrows, dig the weedy soil,
Tread with sad feet our rough and thorny way,
And bear the heat and burden of the day.

Oh! when our sun is setting, may we glide,
Like summer evening, down the golden tide;
And leave behind us, as we pass away,
Sweet, starry twilight round our sleeping clay!

—*Edinburgh.* M.

From The British Quarterly Review.

1. *An Essay on the Causes of Rain, and its allied Phenomena.* By G. A. Rowell, Honorary Member of the Ashmolean Society. Oxford. 1859.
2. *The Rain Cloud: or, an Account of the Nature, Properties, Dangers, and Uses of Rain in various Parts of the World.* London: Society for Promoting Christian Knowledge. 1846.

No water, no vegetables. No vegetables, no animals. No animals, no men.

The due irrigation of the earth is a point of vital importance in the adjustments of creation. The machinery by which this is accomplished is complex, and in many respects extremely recondite; but viewed as a great apparatus for pumping water and sprinkling the surface of the planet, it is impossible to conceive of a happier or a more effective contrivance.

For the better comprehension of the subject, let us venture upon a trifling supposition. In the interior of some continent, just on the spot where an old map-maker would have planted an elephant and castle for want of true topographical material, there lies a farm, which is far removed from lake and river, and at best but stingily supplied with springs or wells. There has been no rain for several years. How is the poor proprietor to keep it in cultivation? Noted as the agricultural mind is for discontent—always complaining of meteorological hardships and indulging in philippics against the skies—he would doubtless avail himself of his privilege of grumbling to the fullest extent, and might perhaps be disposed to abandon his ill-used freehold in despair. To dig a long canal for the purpose of conveying water from the nearest stream, and then to furrow his fields with innumerable little channels for its distribution, would be as tedious and elaborate a process as it would be to plough up all the cornfields of Great Britain with penknives, or reap them with scissors. It would be ridiculous to think of moistening his acres by means of watering-carts, and insane to attempt it by means of gigantic squirts. Not many days ago we watched a man who was watering a spacious area in a fashionable town with a view to subjugate the dust. He had a force-pump mounted on wheels, with a stumpy barrel to hold the fluid, a stumpy hose to direct the stream, and a stumpy lever to expel it from the machine. Stationing his apparatus at a particular point, he slowly scattered the liquid over the ground within range of the jet, and then shifting his quarters, proceeded to operate on a new space, until a gurgling in the tube announced that the receptacle was exhausted. Away he trudged to a cistern, dragging his engine after him, and then with some effort—we thought a little groaning—drew fourteen big pails of water, with which he replenished his reservoir of rain. Returning to the area, our Aquarius executed a little more irrigation, but it was obviously as poor an apology for a shower as a peal of sheet-iron thunder at a theatre is for one of those echoing crashes which seem to tear the firmament asunder. By the time one portion of the ground was syringed, another was nearly dry; here and there were streaks and patches which had been left untouched; in fact so superficial was the sprinkling the place had received, that Beau Brummell, who professed to have caught cold when shut up in a coffee-room with a *damp* stranger, might have bivouacked on the spot without incurring a twinge of rheumatism. Toiling at this rate, thought we, if the whole population of England were converted into drawers of water and workers of pumps, they would scarcely suffice to souse a single county and maintain it in a state of vegetable prosperity.

Now Nature takes all this trouble off our hands. Whilst the owner of our imaginary farm is puzzling his brains to discover how he shall procure the fertilizing fluid—comforting himself meanwhile with many agricultural growls—she is preparing for him a rich and gratuitous supply. Far off—it may be hundreds or thousands of miles away—vapor is ascending from some great expanse of liquid, or from some humid tract of land. Water is the life's blood of the world. To keep it in circulation is not less needful for the health of the planet, than is the flow of the red rivers through our veins for the health of man. But as the fluid always seeks its level, and finds it in the ocean, how is it to be brought back and scattered over the high grounds, or hoisted to the summits of the mountains? How, too, shall it be freed from the salts and other foreign ingredients it may have imbibed in the soil, or found in the sea, and thus return to its duty in a pure and uncontaminated condition?

The magnificent process of evaporation is the first step which is taken for the farmer's

relief. Since water is a fluid of considerable gravity, being eight hundred and sixty times heavier than air (at a temperature of 60° at the level of the sea), it is necessary that it should be rendered portable through the atmosphere. This object is accomplished by converting it into vapor through the agency of heat. The ocean has in fact been called a great still, and the sun may be regarded as the great distiller. But because water when placed in a pan over the fire does not pass into steam, properly so called, until it reaches a temperature of 212°, we must not suppose that it refuses to volatilize all lower degrees of the thermometric scale. On the contrary, it gives out vapor at every stage, though at a tardier rate, and of feebler tension. Even ice and snow will waste away in an atmosphere cooled below the freezing point; for Boyle found that an icicle weighing two ounces, when poised in a balance in the evening, lost ten grains by morning; and Howard ascertained that a circular patch of snow, five inches in diameter, threw off one hundred and fifty grains—equal to a thousand gallons per acre—in the space of a single January night.

Of course the great sheets of water on the globe are the reservoirs from which our supplies of vapor are primarily extracted. Dr. Halley calculated that the quantity brewed by the Mediterranean alone, during twelve hours of a summer's day, amounted to not less than five thousand two hundred and eighty millions of tons. The moisture exhaled from the land must necessarily vary with the humidity as well as the temperature of the spot; but from experiments tried under different circumstances, Dr. Watson estimated that a British acre yielded from two to three thousand gallons in twelve hours. In hot countries, after the soil has been refreshed by showers, the emanations will of course be much more copious. And not only does the ground perspire thus freely, but it must be remembered that vegetables, as well as animals, are constantly discharging their moisture into the atmosphere. The former are extremely sudorific. The aqueous matter transpiring through their pores may sometimes be seen hanging in drops, often mistaken for dew, at the extremities of their leaves. The rate of exudation with them must also be controlled by the warmth and humidity of the air, but Dr. Hales found that some cabbages which were subjected to experiment gave off one pound three ounces during the day, whilst some sunflowers, which are still more famous hands at perspiration, threw out one pound four ounces during the same interval. Men, too—we dare not say ladies—are extremely prone to this process. Not less than two pounds of moisture are daily expelled from the skin and lungs of most individuals; and if a person happens to be flung into a particularly deliquescent mood by stress of heat and exercise, he may contribute five pounds to the atmosphere within the four-and-twenty hours. Were this rendered visible, every one would appear to be enveloped in a little cloud. "I remember," says Watson, "having been greatly heated and fatigued in ascending the ladders from the bottom of the copper mine at Ecton. When I got to the top, I observed by the light of a candle a thick vapor reeking from the body, and visible around it to the distance of a foot or more." Yet such is Nature's wonderful alchemy, that these same effusions—the sweat of sea and land, of herb and beast and man—may shortly re-appear as the tender dew, the fattening shower, or the limpid gush from the mossy fountain. Reckoning the mean annual evaporation all over the globe at thirty-five inches, it has been computed that the total quantity of water poured into the air every year would fill a cistern ninety-four thousand four hundred and fifty cubic miles in capacity. This estimate, however, founded upon Dalton's data, is assuredly too low, for the mean annual issue of rain from the clouds all over the earth is now calculated at five feet.

But, secondly, the simple rise and fall of these exhalations on the spot where produced would do nothing for our impatient farmer in the interior. The aqueous particles must be conveyed from the seas, and set down at his very threshold. For this purpose the atmosphere is traversed by winds which load themselves with moisture, and hurry it off in various directions. A ship freighting itself with merchandise at a foreign wharf, a train starting with luggage from a railway-station, a water-cart filling with liquid at some reservoir, is not more explicit in its mission than the current of air which takes in a cargo of vapor at a great ocean tank, and hastens into the heart of some continent to deposit its beneficent burden. There are winds, like the Harmattan of the desert, which seem to go forth only to wither and destroy. These

greedily suck up all the moisture they can collect from the land, blighting the foliage so that it crumbles to dust, fissuring doors and furniture, opening great seams in the sides of vessels, starting casks of liquid and spilling their contents, and parching the human body as if intent upon reducing it to a state of mummy. But the sea-winds come charged with rich stores of humidity, and hence those which visit the western shores of Europe from the south-west, and the north of Europe from the north-east, are the bringers of rain and the givers of fertility.

Thirdly, however, a mass of moisture floating at a height of from two to four or five miles in the air would be of as little service to yonder anxious farmer as a diamond mine in the moon to a jeweller. How is he to get it down from the skies? Now the quantity of water which can be sustained in the air in an elastic, invisible form is proportionate to the temperature. The higher the thermometer, the greater the priming of moisture required. Treating the vapor-atmosphere which surrounds the globe as a distinct envelope, its pressure may be expressed in mercurial inches—that is, by the amount of quicksilver it will support in the barometric tube. If our seas were all on the boil (212°), the steam produced would poise a column of about thirty inches; but at 80°—the temperature of the ocean in the equatorial regions never mounting much above this figure—the dose of vapor which the air will carry is only sufficient to balance a single inch. At 71° it is equal to three-quarters of an inch, at 59° to half an inch, and at 39° to a quarter of an inch. If, therefore, any current of air heated to 80° should start on its journey with a full cargo of vapor, and be deprived of about 9° of caloric, it must throw overboard one-fourth of its load, or if reduced by 21°, one-half. Its tonnage, we may say, is lessened by every decrement of heat. The discarded moisture will then appear in a visible shape, and if sufficiently condensed, may descend in the form of rain. In fact, whenever a humid current encounters a colder stream of air, or enters a chillier tract of sky, or whenever the atmosphere is in too watery a mood to receive further accessions of vapor, the surplus will be rejected, and must manifest itself either as mist, fog, cloud, dew, rain, hail, or snow.

But, fourthly, when moisture thus transported from a distant sea has been reconverted into a liquid, it is necessary that its precipitation should be conducted with considerable caution. As a cloud is a great cistern containing thousands of tons of fluid, it is clear that if this were all liberated at once it would inflict serious damage upon the vegetation below, and might probably drive the farmer to distraction. No crops could withstand such a local deluge. They would be beaten to the ground at a stroke. The leaves would be stripped from the trees, and a forest left standing under bare poles like a ship whose canvas had been wrenched from its masts by an unexpected gale. The soil itself would be ploughed up and washed into the nearest stream. In cities, too, as well as in the country, the approach of a nimbus would be eyed with suspicion, and men would have to fly to buildings for shelter, since umbrellas, though made of sheet-iron, would afford but doubtful protection. There are cases of violent discharge which show what mischief might constantly ensue were not the breaking up of a cloud regulated with consummate nicety. Land-spouts, for example, occasionally make their appearance. One swept over a moor near Colne in Lancashire, in 1718, and tore up the ground down to the very rock, some seven feet below, making a deep gulf for above a quarter of a mile, as Dr. Richardson describes, and destroying ten acres by the flood. "The first breach where the water fell," says he, "was about sixty feet over. The ground on each side the gulf was so shaken that large chasms appeared at above thirty feet distance, which a few days after I observed the shepherds filling up, lest their sheep should fall into them." Far more frequent, however, are hailstorms; and in some parts of the globe, particularly in the south of France, these visitors constitute a fearful scourge. Pebbles of ice, weighing sometimes as much as half a pound, and often so dense and elastic that they rebound from the pavement, are showered upon the earth, ruining the vines, crushing the corn, snapping the branches from the trees, killing poultry, lambs, dogs, possibly deer; and, worse still, breaking human heads, or even destroying human life. In a tempest of hail near Offley, in 1767, a young man was left dead, one of his eyes being struck out, and his body blackened all over with the blows he had received. In 1788, a storm traversed nearly the whole length of France, mapping out its course by

a deposit of large hailstones, and battering the unhappy provinces beneath with such fury that the soil was changed into a morass, the fruit-trees demolished, and the country turned into a comparative desert, in the space of a single hour. On the 1st of August, 1846, the English metropolis underwent an icy bombardment. The crashing of windows and skylights was terrific. Seven thousand squares of glass were shattered at the Houses of Parliament, a still greater number at Broadwood's and other large manufactories, and in some streets scarcely a sound pane was left. Our European stones, however, are not always to be put in competition with the formidable grape-shot which is now and then rained down from an Indian sky. In 1855, Dr. Buist communicated a paper to the British Association, detailing a variety of storms in Hindostan, in some of which lumps as big as pumpkins, and in other masses of still greater dimensions, had been hurled to the ground or driven through the roof like cannon-balls. Bullocks were not only felled and men severely injured, but on the 12th of May, 1853, it is said that eighty-four human beings and three thousand cattle were killed in a tempest of hail in the Himalayas north of the Peeshawur.

Happily, however, these are exceptional modes of discharge. Profitable as they may be to glaziers when they do occur, they cannot fail to be intensely distasteful to the proprietors of houses and farms. Vastly more gentle and graceful is the process by which the contents of an ordinary cloud are conveyed to the soil. Instead of descending in a sheet, the water trickles through the air in tiny drops, each about a quarter of an inch in diameter, as if it had passed through some finely perforated sieve. The fluid is powdered, so to speak, in order that it may scatter itself over a large area, and alight without ruffling a leaf or crushing a blade of grass. Softly the work commences, softly it continues, as the cloud-cistern sails slowly over field after field, leaving no part untouched, but moistening every vegetable, from the idle thistle to the kingly oak. Who would not be in raptures with the process if, possessing sufficient intelligence to comprehend the wants of the soil, and sufficient experience to appreciate the difficulty of meeting those wants by artificial means, he stood and watched the disburdening of one of these ships of the sky for the first time in his life?

But, however delighted our imaginary farmer may be with this particular supply, he would doubtless resume his murmuring habits, after a few days had elapsed, unless assured that clouds would be periodically raised and despatched for his benefit. There are some tropical tracts where it never, and others where it rarely rains. In the land of the Pharaohs, and in certain portions of the country of the Prophet, a shower is almost as great a curiosity as a landspout or a fall of meteoric stones would be with us. In Peru you need never unfurl an umbrella except, perhaps, once or twice in a long lifetime. When a nimbus does visit the latter region and spill a few bucketfuls upon the ground, we think it extremely likely that reporters of the phenomenon post off to the "oldest inhabitant" in order to brush up his memory and profit by the genuine antiquity of his reminiscences in any comparisons they may institute. When *la serenidad perpetua* of the district was disturbed by rain in the early part of the eighteenth century, so little did it agree with the people, that an epidemic broke out amongst them; and when a single shower descended upon the town of Lembeyeque, in 1790, it brought down several of the houses, which are so slenderly built, that a French or an Indian hailstorm would pulverize a city in a trice.

There have also been seasons of protracted drought in various quarters of the globe. In the days of Ahab the land of Israel lay withering for a time under the spells of Elijah, for "he prayed that it might not rain, and it rained not on the earth by the space of three years and six months." Between 1827 and 1830 a great water-dearth occurred in the Pampas. During this *gran seco* (according to Sir F. Head) all vegetation failed, the country assumed the appearance of a dusty high-road, the soil was so blown about that landmarks were obliterated, and numerous disputes afterwards arose respecting the boundaries of property; cattle perished on every side for want of food and drink, one proprietor alone at San Pedro losing twenty thousand; and such was the rush of animals to the river Paraña that several hundred thousands were supposed to have died in the stream, either from excessive potations, or from inability to crawl up the muddy banks.

Still, deducting these local or transitory cases, our farmer will find that nature has

provided for the due watering of the earth according to the requirements of climate and geographical position. As a general principle, the quantity of rain increases as we advance from the poles to the equator. In the regions where the sun is doing the greatest stroke of business in the evaporating way we may expect that a shower will be a very emphatic production. "A black cloud which had formed suddenly," says Mr. Burchell, "in an instant, without perhaps more than a minute's notice, emptied its contents upon us, pouring down like a torrent and drenching every thing with water. The parched earth became in the short time of five minutes covered with ponds." Some of these tropical effusions, indeed, might best be described in the graphic though inelegant language of a man who, in referring to an English storm, informed Mr. Rowell that the clouds seemed so near the earth that he could scarcely get under them; "it did not rain at all, it came down anyhow." Indeed, you might fancy that Kühleborn, the water-demon of Fouqué's tale of *Undine*, was abroad with particularly diluvial intentions, if these sudden cloud-raptures were not usually as brief as they are passionate.

It is another general law in hygrometry that the fall of rain decreases as we leave the shores of a continent and travel into the interior, because we are continually receding from the great nursery of vapor. For the same reason the western coast of our island receives a more liberal soaking than the eastern: the huge Atlantic producing a larger amount of vapor than the petty German Ocean. At North Shields the fall is twenty-five inches in the year; at Coniston, on the opposite shore, though in nearly the same latitude, it is eighty-five inches, or more than thrice as much. The tears annually shed by the sky in the oriental half of Great Britain attain a depth of twenty-seven inches only, whilst in the other moiety of the kingdom they are gauged at fifty or fifty-five inches.

In a mountainous region the precipitation of moisture increases from the plain to the peak. Why it does so has been the subject of much discussion. Some ascribe the result to the low temperature of the hills; others treat it as a mechanical consequence arising from the arrest of the vapors; but Mr. Rowell seems to look upon the rocky spires as great lightning rods which plunder the clouds of their electricity, and compel the watery globules to sink by depriving them of their sustaining element. Be this as it may, the mists which wrap themselves round the heads of the hills are phenomena of daily occurrence, and the lachrymose state of craggy spots has been tested by repeated observations. Thus, in the year 1854, whilst the clouds deposited about twenty inches of moisture at Durham, twenty-five at Leeds, thirty-one at Carlisle, and thirty-four at Liverpool, the quantity which tumbled amongst the mountains of the Lake district amounted to eighty-seven inches for Buttermere, one hundred and nine for Wastdale Head, one hundred and twenty-one for Grasmere, and not less than one hundred and fifty-one for Seathwaite in Borrowdale. The latter place, therefore, received from seven to eight times as copious a dousing as the staid old city of St. Cuthbert, so renowned for its mustard and old maids. Still these British outpourings are far inferior to the furious downfalls of Hindustan. Colonel Sykes reports that at Malcolmpait, on the Mahabuleshwar Hills, the annual evacuation of rain from the atmosphere is three hundred and two inches, and that at Cherraponjie, in the Cossya Hills, it amounted, in 1851, to the astounding quantity of six hundred and ten inches, or fifty feet ten inches! Singularly enough, too, a slight difference in locality will sometimes produce a great difference in humidity. There is a farmhouse, about a mile and a half from Ennersdale Lake, at which there falls only half as much rain as descends at the lake itself. Even forests have their influence in drawing out the moisture from the air, for, when extensive woods have been reduced or destroyed, as at Marseilles, a notable decline in humidity has ensued. It is also an interesting, and to many may seem a paradoxical fact, that rain appears to increase in quantity as it approaches the earth; so that, if a series of pluviometers were stationed at various elevations, as if on the staves of a ladder, the lowest would exhibit a greater charge than the highest. There is, in fact, generally more rain at the foot of a tower than at its top. Nor is the difference trifling; for, whilst one of Dr. Heberden's gauges on the roof of Westminster Abbey indicated a fall of 12·099 inches, another at the base showed a depth of 22·608, or nearly twice as much.

In similar experiments by Professor Phillips

and Mr. Grey, at York Minster, a deposit of 14·903 inches was chronicled at a height of two hundred and twelve feet, whilst 25·706 inches of fluid were found in a gauge on the ground. A difference in altitude of seventy yards thus made a difference of seventy per cent in the amount of rain. To explain this curious circumstance it is generally supposed that the drops, which are exceedingly small at the commencement of their journey from the cloud, are augmented by the condensation of vapor, or that they pick up moisture as they tumble through the humid strata they must necessarily traverse. It should be observed, however, that the quantity of rain precipitated in any particular region may be great, whilst the number of rainy days is comparatively limited. Within the tropics, where the clouds are most prodigal in their effusions, there are regular seasons of dryness, when the natives cannot reasonably expect any showers; but in the temperate zones, an almanac-maker might book one for any day in the calendar without appearing to violate a single meteorological law. In England it seems that you ought to be waterproof on an average for one hundred and fifty-two or one hundred and fifty-five days out of the three hundred and sixty-five; in the Netherlands for one hundred and seventy; and in the east of Ireland for two hundred and eight. In other words, it rains every other day with us, whilst in Siberia it rains only one in six; and in the north of Syria, about one in seven. High as this estimate may appear, we have particular places in our island where it is far exceeded. There is Manchester, for example. What a terrible city is that for people who love fine weather and brilliant sunshine! For six days in the week it is reputed to be in a state of melancholy drizzle; and though there may be much malice in the assertion, no one can doubt that the place is excessively addicted to sky-weeping. Its atmosphere is generally dripping with grimy tears, and the streets are lavishly laved with a strong solution of soot. In fact, the mere mention of a visit to the metropolis of cotton may elicit an exclamation similar to Fuseli's, when proceeding to inspect some humid paintings of a brother artist, "Give me my coat and umbrella; I am going to look at Mr. Constable's pictures."

Sometimes, however, showers of an anomalous description have been known to fall. Our agriculturist would look rather blank if he discovered that his rain was salt. Not wishing his farm to be put in pickle, he would decidedly object to a precipitation of brine. When such cases have occurred, the trees have been found whitened by the crystals, and the herbage has become so pungent that the cattle could not touch it until compelled by hunger; and though there could be no difficulty in ascribing the origin of these saline particles to the sea, whence they had doubtless been whirled by high winds, yet a storm of chloride of sodium has been experienced in Suffolk, at a distance of twenty miles from the ocean.

Or what would our farmer say to a shower of ashes or dust? In Zetland, a dark powder was once rained from the heavens, and grimed the faces of the people as if it were lampblack. Heavy drizzles of sand or ashes, the former whisked from the desert, the latter ejected from some volcano, have frequently been encountered at sea; and so thickly has the material strewn the decks of passing vessels that it was necessary to shovel it away like snow. The dust-storms of India are quaint productions. "The sky is clear," says Mr. Baddeley, "and not a breath moving; presently a low black cloud is seen in the horizon, which you are surprised you did not observe before; a few seconds have passed, and the cloud has half filled the hemisphere; and now there is no time to lose—it is a dust-storm, and helter-skelter every one rushes to get into the house in order to escape being caught in it." It is, in fact, a revolving spout or shower, with dust for its burden instead of water.

As little would the gentleman be pleased with a fall of "sulphur." Yellow rains have happened in certain quarters of Europe; and from the color of the substance as well as the readiness with which it inflamed—matches, it is said, having been produced by its means in Germany—the good people assumed that it must needs consist of genuine brimstone. These effusions, however, are now known to be botanical. The pollen of the flowers of the pine, birch, alder, and other trees is a light, yellow material, which may be easily transported by the breezes, and deposited in the form of a gamboge shower.

More appalling still are the red rains, which have been mistaken for blood. Imagine the consternation of weak-minded people in the palmy days of superstition, when there

was a witch in every hamlet, and a spectre attached to every hall, if the heavens began to distil gore! In the year 1608, great red drops were observed upon the walls of various buildings at Aix and the vicinity; and the event so shook the nerves of the neighborhood, that the very husbandmen—fellows whose sensational fibres were probably as tough if not as thick as cart-ropes—ran from the fields in order to escape the sanguinary shower, believing that it must have originated with Satan, or some of his myrmidons at least. Peiresc scrutinized the marvellous occurrence with some care, and found that it was due to a butterfly, which, on passing from the chrysalis state, discharged a ruddy substance not very dissimilar in appearance to blood. In other instances of red rain, the peculiar hue has been traced to infusoria, or to the minute cells of certain vegetables. The red snow is the mountain regions is tinged with the *Hæmatococcus nivalis;* the green snow with the *Protococcus viridis.*

Perhaps, however, our farmer might be better pleased if the skies were to secrete a sort of "butter!" Such was the case, we are assured, in many parts of Munster and Leinster in the year 1695–6. According to the Bishop of Cloyne, the substance was so called from its consistency and color, being soft, clammy, and of a dark yellow; it fell in lumps, often as large as the end of a finger; the cattle did not reject it, but fed in the fields where it lay; and country people who had sore heads anointed them with it, declaring that it healed them. This greasy exudation was supposed by some to have been chemically elaborated in the air, though it is much more probable that it was an animal product, like the honey-dew excreted by certain insects.

But better things than ostensible butter have been reported in the meteorological way. "On Saturday last," so runs a letter communicated to the Royal Society in 1661, "it was rumored that it *rained wheat* at Tuchbrooke, a village about two miles from Warwick. Whereupon some of the inhabitants of this town went thither, where they saw great quantities on the way, on the fields, and on the leads of the church, castle, and priory, and upon the hearths of the chimneys of the chambers. And Arthur Mason, coming out of Shropshire, reports that it hath rained the like in many places of the county. God make us thankful for this miraculous blessing!" But the learned society, instead of being grateful for the substance, concluded that it was nothing more than the seeds of ivy-berries conveyed to the spot by starlings.

Many, however, are the illegitimate forms of rain with which that poor agriculturist might be puzzled or tormented. He would feel quite cross with the world if his lands were visited by a shower of grubs or worms such as appeared in the government of Tver, in October, 1827; or a rain consisting of herrings, such as happened at Ula in Argyleshire, in March, 1830; or falls of fish of other kinds, such as have occurred in India and many parts of the world; or, worse still, by outpourings of frogs, such as have been experienced in France. In 1804, a cloud burst near Toulouse, and a host of these reptiles came pattering to the ground, covering the fields so thickly, that in some places there were three or four living layers, and paving the high road so profusely that the diligence crunched its way through their bodies for a considerable distance, and thousands were slaughtered beneath the horses' hoofs. Could the atmosphere well be in a more diseased condition, even if it were to indulge in that oft-quoted but rarely witnessed phenomenon—a rain of cats and dogs?

But leaving our fancy farmer in the enjoyment of a genuine shower, let us briefly advert to the theory which Mr. Rowell so ably but so modestly supports. This meteorologist has quite a passion for rain. He fell in love with the phenomenon whilst a mere boy, and his affection appears to have ripened into philosophical *furor* before he became a man. From his earliest days there seems to have been for him a peculiar charm in a shower, and a fearful fascination in a thunderstorm. He thought of them whilst waking, dreamed of them whilst sleeping, and in seasons of sickness, when the body was incapable of effort, the mind was busily employed in the study of his favorite meteor. Fearing that the scientific sprite which had taken possession of his brain would exert a mischievous influence over his health, he made strenuous efforts to exorcise the intruder, but to little purpose; for a single gleam of lightning, or any passing oddity in the weather, was enough to rekindle the passion of this cloud-haunted man. Now, familiar as we are in practice with the subject of rain, the theory is sur-

rounded with a number of difficulties—so much so, that in the opinion of many, perhaps, we may well wonder how it could ever rain at all. Seeing that water is many hundred times heavier than air, by what means, it has been asked, does it climb into the atmosphere and continue floating in the thin altitudes which the cirrhi undoubtedly attain? How is the vapor condensed into particles which become visible to the eye, and compose the various species of cloud? Are these particles simply drops of diminutive size—mere water dust, if we may so speak—or are they vesicular, that is, little balloons, consisting of an aqueous film with air or vapor enclosed? What is it compels them to condense and occasionally to descend in torrents, accompanied by fearful explosions of electricity, or to freeze into lumps of ice as large as oranges or pumpkins?

These, with many other questions, have been thorns in the sides of meteorologists, which theorists have endeavored to extract with various degrees of skill. Descartes supposed that the vesicles were little spheres of water rendered buoyant by the *materia subtilis* of space. Dr. Halley suggested that the rise of the vapor-atoms might be due to a "flatus, or warm spirit, or perhaps to a certain kind of matter whose *conatus* might be contrary to that of gravity." Franklin contended that moisture was dissolved in the atmosphere as salt is dissolved in water; but that when repudiated, the aqueous particles still remained in suspension by adhering to the molecules of air. Mr. Rowell's hypothesis is, "That the atoms of water being so minute, are, when completely enveloped in their natural coatings of electricity, rendered so buoyant as to be liable, even when in their most condensed state, to be carried off by slight currents of air; but if expanded by heat, their capacity for electricity being increased by their increase of surface, they are then rendered buoyant at all times, and are buoyed up into the air by their coatings of electricity; when, if condensed, they become positively electrified, but are still buoyed up by the electricity, till, on the escape of the surcharge, the particles fall as rain." In other words, the water-atoms are enabled to rise when their electric charge is augmented by heat, but compelled to fall when the surplus is withdrawn. If the vapor, when condensed by cold, should be in a position to part with a portion of its electricity, the particles will approach each other by virtue of their natural attraction, and thus become visible as clouds; but if the surcharge totally escapes, they will unite into large drops, and descend as rain. To explain the peculiarities of a thundercloud, Mr. Rowell says that it may be regarded—

"as a vast mass of electricity interspersed with minute particles of water, the former being in the proportion of not less than one thousand to one of the latter. Let us consider what would be the consequences of a formation of rain in such a cloud. If but a few particles of vapor coalesce and form one drop, they would be no longer buoyant, and the drop in falling through the dense vapor would increase in bulk from contact with other particles. Now, as the electricity set free by this agglomeration of particles would instantaneously pass away, either to the surface of the cloud or by dispersion amongst the particles composing it, a vacuum or rarefied space would result on the instant of the formation of rain, when the sudden pressure of the surrounding portion of the cloud into the space would bring more particles into contact, and more rain would be formed."

Now, we make no attempt to appraise the exact quantum of originality which belongs to this theory. It is true that the doctrine of electrical atmospheres has been asserted in one form or another by Eeles, Monge, Eason, and other writers, and that the influence of electricity upon the phenomena of rain has been maintained by Dr. Thomson and several eminent men; but we can readily believe that Mr. Rowell has worked out the hypothesis from his own observations, and purely by the aid of his own intellectual funds. And a neat, handy hypothesis it certainly is. It satisfies many conditions, and harmonizes with various well-known facts. Volta, for example, discovered that when water was converted into vapor it carried away electricity; and it has been clearly ascertained that if a vessel be insulated, the quantity of moisture evaporated in a given time is much less than if it were in free communication with the earth. When this vapor again is condensed into mist, we know, from Mr. Crosse's pryings into a November fog, that under certain circumstances it bristles with electric fire; and when it is suddenly precipitated, as in a thunderstorm, we find the angry fluid passing from cloud to cloud in blinding flashes, or returning to the earth in death-dealing bolts.

Facts like these must necessarily afford

considerable countenance to the theory. That it is free from difficulties Mr. Rowell himself would not wish to assert. With regard to the buoyant power of vapor, we think that the demand for electrical coatings is over-estimated. The well-known law by which one aeriform fluid spreads through the interstices of another as if the space were vacuous, though at a slower rate, strips the question of ascent of much of its mystery. Water-vapor is lighter than air—lighter even than the vapor of such volatile liquids as muriatic or sulphuric ether. It not only rises eagerly therefore in the atmosphere, but, in the opinion of Sir John Herschel, "carries up with it much of the air with which it is intermixed, disengaging itself no doubt from it in its upward progress, to become entangled, however, with fresh particles, which again it carries upward to abandon them for others." In like manner, when the risen vapor undergoes condensation, we are inclined to believe that if it moulds itself into true bubbles or vesicles, it does so by settling upon the particles of air and imprisoning them within a watery shell, and these, increasing in weight by further accessions of moisture, will sink to the earth when they become too ponderous for the medium in which they swim. But as the included air will expand if heated by the sun, we see why a cloud may rise, or its upper and exposed portion may disappear after the fashion which these nebulous masses are known to affect. Should the particles, however, instead of being vesicular, prove to be solid, as Dr. Waller and others have endeavored to show, still the minuteness of the spherules may be sufficient to explain their suspension as clouds, whilst their increase in size and weight by further condensation should account for their fall as rain.

Mr. Rowell's theory does not, and indeed cannot dispense with the agency of heat. To spiritualize the water into vapor, heat must be absorbed: to secularize it into rain, heat must be discharged: 960° F. of latent caloric must be received in the one case, rejected in the other. It is by augmenting the temperature of the liquid atoms that they are expanded, and their capacity for electricity enlarged; it is by lowering that temperature that they are subsequently brought into a state of surcharge. The question is, therefore, whether we acquire any very substantial leverage after all by assuming the existence of "coatings"—for the point does not yet admit of proof—particularly as the materiality of the electric fluid, and therefore its buoyant qualities, have never been established. On the other hand, Mr. Rowell has a right to say that, if the changes through which vapor runs, in its circulation from earth to heaven and heaven to earth, can be accomplished by the fluctuations of caloric, as the ordinary theories imply, may they not be much better effected through the combined agency of heat and electricity?

From this theory a curious corollary may be deduced. An interesting but somewhat quixotic question has occasionally been asked—Can we produce rain at pleasure? In Africa we know there are Caffre conjurors who profess to perform this feat. With them rain-making is as much a business as the manufacture of umbrellas or waterproof clothing is with us. You want a few showers? Certainly! They can be had for a satisfactory fee. Hasten to the dwelling of the magician, carrying with you the most seductive presents you can command, and if your terms are liberal, the cloud-compelling man will execute a variety of incantations, and then dismiss you with instructions to return in perfect silence, never once looking back, but constraining every person you meet to turn on his steps and accompany you home. In case these injunctions are obeyed, your lands will be speedily gladdened by a rich effusion from the sky. What may be the price of a good nimbus does not exactly appear, but doubtless there are people in Europe as well as in Africa who would pay a handsome sum if a really superior article could be procured whenever they wished.

The Caffre rain-doctor, however, does not pretend to work on philosophical principles. Others, more learned and intelligent, have proposed to accomplish the same end by strictly scientific means. Several years ago, Mr. Espy of the United States suggested that clouds might be produced by kindling large fires, and inducing the air to ascend in huge columns, which would draw in vapor and ensure a precipitation of moisture. This opinion was supported by the fact that where large prairies have been set alight as in Louisiana, or extensive forests burnt as in Nova Scotia, heavy discharges of wet have invariably resulted. For the same reason great battles and sea-fights are said to produce rain, though Arago's observations on artillery-prac-

tice by no means favor the conclusion; and the tall chimneys of manufacturing towns may likewise tend to excite a drizzle such as that for which Manchester is distinguished. Mr. Rowell, however, considers that a stratum of moist air may be tapped by withdrawing its electricity, and for this purpose he suggests that conductors should be raised to the clouds by the agency of balloons. In confirmation of his views he quotes Mr. Weekes, of Sandwich, who states that on several occasions, whilst operating with electrical kites under a light, fleecy cloud moderately elevated, after a current of sparks had passed from the apparatus for ten or twelve minutes, he found himself bedewed with a fine misty rain, and on looking up to the cloud, discovered that it was greatly reduced in its dimensions. Of course, if we adopt Mr. Rowell's theory of rain, there can be little difficulty in admitting that masses of vapor may be broached like beer-barrels, and, as a matter of philosophical experiment, it might be very delectable to create a gentle, though a transient, mizzle in a time of obstinate drought, but as a practical question we fear that, if the smoke of a great conflagration is necessary to abstract the electricity of the vapor *le jeu ne vaudra pas la chandelle*, seeing that we have no spare forests to burn; or if the rain-making is to be accomplished by such conductors as balloons can carry, we could scarcely expect the drenching received by the soil to be either extensive or profound.

Looking, then, at water as the great agent of fertility, as the chosen element by which the world is kept sappy and verdant, we ask whether the arrangements made for the regular distribution of this fluid are not singularly felicitous? Long ago the land would have been totally drained, and every river would have run itself dry, had there been any flaw in the machinery by which the floods are uplifted from their beds, and restored in needful quantities to the soil. But Nature's gigantic water-works are never at fault. Every year whole lakes are hoisted into the atmosphere and lowered with such exquisite precision that seedtime and harvest, the former rain and the latter rain, are certain to arrive in due succession. The sea is ever laboring for the land. The traffic between the billow and the furrow is conducted by the ministry of the clouds. Pleasant to think of these beautiful carriers of moisture! Filled as it were by invisible hands at the storehouses of vapor, they catch the breeze, and make for the shore, where they deliver their load, some on the plains, that the fields may rejoice in the refreshing shower, some on the mountain slopes, that the brooks and streams may be fed; and then the surplus fluid which the ground rejects is rolled off to the ocean only that it may return with generous obstinacy, and thus pursue its never-tiring rounds. By the same means, too, the heat and electric fire which the vapor abstracts from the surface are transported into the upper regions of the air, and thrown out in the colder strata where some equalizing process is required. And not less useful is the rain in scouring the atmosphere, dissolving foreign ingredients, sweeping down impurities, and cleansing the ground itself from much that is feculent and unhealthy. Nor is it to be forgotten that this mild, gentle meteor is an active agent in the great geological operations by which the level of land and ocean is altered, and the very aspect of the planet remodelled during the long run of ages; for the soft water-drops are chisels in the hand of Time with which he indents the vales, seams the sides of the hills, and even abrades the granite rocks, and, where accessible, lowers the pride of their craggy crowns.

Spite, then, of all the discomforts which are incident to turbid skies and muddy paths and splashy streets, let us admit that rain is one of the finest and most fascinating phenomena in the universe. Touching as well as beautiful was the dying request of Saint Swithin, Bishop of Winchester in the reign of Egbert, who departed this life in the year 836: "Let me," said he, "be buried where the raindrops may water my grave." For a hundred years, accordingly, the clouds were permitted to weep freely over his resting-place; but at the expiration of that time the monks resolved to convey the defunct prelate into the interior of the church. It was an honor for which the episcopal shade had no desire. Dead as he was, he took measures (so the tradition runs) to frustrate the pious scheme, and at the period appointed, the 15th of July, the floods began to descend so lavishly that the work of exhumation was postponed. Next morning, when the attempt was renewed, the clouds gave out their contents as before. For forty days did the windows of heaven continue open; until at

length, discovering that the good saint entertained a strong objection to the translation of his remains, the monks were fain to abandon their project, and leave him to his rainy repose. And if there *could* be any sense of poetry in the tomb, would it not be sweeter to rest where the clouds might cast their shadows on the grassy grave, where the showers might softly descend like the tears of lamenting friends, where the smiling sunshine might gild the fallen drops, as Faith alone can gild the griefs of life, where the winds might come and go, whispering peace and murmuring their gentle dirges for the dead—sweeter far, we say, thus to lie, than to be imprisoned in lonely state in a splendid mausoleum, like a captive lodged mockingly in some dark dungeon of marble?

THE EFFECTS OF SMOKING.—The remarkable research made by M. Bouisson upon the danger of smoking has attracted the notice of the Academie, and has been rewarded with high praise. The horrors hitherto unknown, or unacknowledged, with which smokers are threatened, nay more, convicted, by M. Bouisson, are sufficient upon bare anticipation to ruin the revenue and the pipe-makers also. Cancer in the mouth, M. Bouisson declares to have grown so frequent from the use of tobacco that it now forms one of the most dreaded diseases in the hospitals, and at Montpelier, where M. Bouisson resides, the operation of its extraction forms the principal practice of the surgeons there. In a short period of time, from 1845 to 1859, M. Bouisson himself performed sixty-eight operations for cancer in the lips at the Hospital Saint Eloi. The writers on cancer previous to our day mention the rare occurrence of the disease in the lips, and it has therefore become evident that it must have increased of late years in proportion with the smoking of tobacco. M. Bouisson proves this fact by the relative increase in the French duties on tobacco, which, in 1812, brought an annual amount of twenty-five millions, and now give a revenue of one hundred and thirty millions; almost that attained by the duties on wines and spirits, and far beyond that rendered by those on sugar. M. Bouisson remarks, justly or not, that "this figure, extravagant as it may appear, fades into insignificance before that attained by the British tax, which, according to Dr. Seymour, amounts to a fabulous sum, in a country where boys smoke from five o'clock in the afternoon till three o'clock in the morning, and where children of ten years old are known to consume as many as forty cigars in a day!"

The use of tobacco rarely, however, produces lip cancer in youth. Almost all Bouisson's patients had passed the age of forty. In individuals of the humbler classes who smoke short pipes and tobacco of inferior quality, the disease is more frequent than with the rich, who smoke cigars or long pipes. It becomes evident, therefore, that it is owing more to the constant application of heat to the lips than to the inhaling of the nicotine, that the disease is generated. With the Orientals, who are careful to maintain the coolness of the mouthpiece by the transmission of the smoke through perfumed water, the disease is unknown. M. Bouisson, whose earnestness in the cause does him the utmost credit, advises a general crusade to be preached by the doctors of every country against the immoderate use of tobacco, as being the only means of exterminating the habit; because, although the most powerful sovereigns have been powerless to prevent it—although Sultan Amurath threatened in vain to cut off the noses of those who smoked, and Peter the Great vowed direst vengeance against all smokers, and even the thunders of the Vatican have been hurled against them in vain, there is one thing which mankind holds in more horror than a noseless face, or even an excommunicated soul—and that is an untimely death. Let young men be once impressed with this truth, and the "Art of Smoking," which one of our best authors has lately extolled as the finest of all the fine arts, will soon be set aside and forgotten.—*London paper.*

THE long-vexed historical question of the manner of death of Charles XII. of Sweden, has just been settled at Stockholm. On the solicitation of Professor Fryxell, the celebrated Swedish historian, the tomb of the great warrior-king was opened on the first of September, in presence of the present king, his ministers, and several medical men, when the latter carefully examined the remains of Charles. It was found that death had been occasioned by a fragment of a cannon-ball which entered at the left side of the head and passed out on the right, a little below the ear. This clearly proves that the shot which killed the king came from the fortress of Friedrichsstein and not, as is often asserted, from his own camp; for it is a well-known fact that Charles at the moment of his death was standing in the trenches, with his *left* side turned to the enemy.

CHAPTER XX.

THE PALACE AT ELY.

THE Lord Bishop of Ely and his brother of Durham had already, no doubt, in the course of the evening, discussed high matters of church and state with all the gravity which became a legate of the sovereign pontiff and the chief-justice of the king. But William Longchamp was not a man to suffer the weight of public business to become at any time too oppressive; and the sounds which now found their way through the open doors of the long and lofty chamber, where the prelates were sitting with two or three chosen guests, into the outer apartment, thronged with his princely retinue, bore witness that the energies of government were at this moment in a state of wholesome relaxation. Helion de Blois, admitted on terms of equality, by the rare prerogative of genius, to a board where dukes were sometimes treated as inferiors, had just concluded one of his most delicious *chansons;* and as the last cadence of voice and instrument died away amidst the gentry murmured applause of the legate and his noble guests, a loud buzz of irrepressible admiration broke from the listening crowd without, whose delight was scarcely kept within sober bounds by the respect due to the august presence in whose sight and hearing they were.

The company there assembled consisted of the officers of the legate's household, and the numerous dependents and followers of humble rank whom his pride or his hospitality gathered round him; for the knights and others of noble blood who rode in his train, except the privileged few who were admitted from time to time to his own table, were entertained apart in the guest-hall, which lay in another quarter of the building. Those who now thronged the spacious antechamber formed a very miscellaneous assemblage; impoverished Englishmen of gentle birth, foreign adventurers, Gascon and Hainault captains, esquires, and pages, minstrels, rhymesters, and professors of magic, all found food and shelter in that princely household, and maintained their position there as best they might, giving the chamberlains occasionally some trouble to settle disputed claims of precedence. Raoul sat amongst them, recovered from his late exhaustion, having found rest and solid refreshment more efficacious remedies than any which the leeches were likely to have prescribed, and now awaiting with boyish impatience the audience which he had come so far to seek. For, amongst the motley company in which he found himself, he had recognized, and joyfully hailed as a friend amidst such a maze of strange faces, the esquire with whom he had already made acquaintance on the road; and, by an importunity so urgent as almost to affect that officer's well-worn feelings, as well as to excite his curiosity, had secured his promise to introduce him to the presence-chamber, if possible, before the prelate should have withdrawn for the night. He now learned also, from the same quarter, that the reported visit of the prelate to the house of Ladysmede, upon which Sir Godfrey had founded his invitation to his kinswomen, was in all likelihood as pure an invention as the pretended departure of Sir Nicholas; Longchamp's esquire, at least, knew nothing of any such intention on his master's part, and thought it highly improbable.

"My lord hath sent word to the abbot of Ivelsby that he will ride thither from Michamstede, and lie there one night, and so on with the morrow's dawn for Huntingdon," said he; "and I much doubt, besides, whether he hath so much love for your knight of Ladysmede as to accept his hospitality. Who is that strange knight that is now lodged with him—who bears, it is said, secret letters from the king?"

"He is one Sir Nicholas le Hardi, a knight out of Hallamshire," replied Raoul, "and has borne a good lance against the infidels, if one may trust his esquire's word of him; he is gathering money for King Richard, but he makes no secret of his errand."

"He is stirring up other matters as well," said his companion; "we have heard of him at Lincoln; he hath been dealing with some ill-contented spirits there, and listening to their complaints how that the lord legate carries himself higher than he should, and bestows shorter and sharper justice on the king's enemies than is pleasing to some of those who call themselves the king's friends. I hardly know among which Sir Godfrey is to be reckoned; but let this wandering knight look to it—he will find the royal letters stand him in poor stead, if he be found practising here against the king's vicegerent. But I am speaking of matters with which you and I, young friend, have naught to do."

An imprudent confidence was not one of the

speaker's failings, and he gladly broke off the conversation in the general silence which ensued when the word passed round that Helion de Blois had risen with his viol in hand, and all crowded forward to catch what they might of his incomparable strains.

"Now, young sir," said Raoul's new friend, taking advantage of the murmur of applause which followed the Norman's song, and pushing him forward through the throng towards the folding-doors which stood open—"now should be our time or never; my lord will be in happy humor now, and will listen to your tale, provided it be reasonable, and shortly worded—which it hardly shall be, an it be a woman's, unless you shape it afresh. If you would win favor, see that you speak him bold and fair, and with as few needless words as may be."

With the full intention of profiting by this sensible advice, Raoul followed the esquire until he stopped within a few paces of the table where the prelates were sitting, and repeated the lowly obeisance which his conductor made both before and after he caught his master's eye.

"Whom have ye there?" asked Longchamp somewhat sharply; then, as his quick glance recognized the stranger who had stopped their progress a few hours back, he smiled slightly, and his bold, handsome features lighted up with the expression of kindly humor which became them best. "Ho! our young friend of the roadside? that we all played the good Samaritan by! Come—did the leeches do their part by thee? Did they pour in the oil and wine? Or, 'faith, perhaps the wine had been poured in a thought too freely already? How was it, now?"

Poor Raoul's presence of mind was nearly failing him again. The question was an awkward one; for he felt conscious that the wine, however innocently on his own part, and on the good abbess', had had its full share in his discomfiture. He blushed and hesitated, and was not much assisted by the admonitions which his introducer was giving him in the shape of nudges to speak out. He stammered out something that was inaudible.

The bishop's esquire, who knew his master's impatience, and was already repenting him of his introduction, came to the rescue on his own behalf rather than on Raoul's.

"He comes from Ladysmede, my lord, and hath a message to your holiness—of urgency, as I understand."

"It had need be urgent, if I am to be troubled with it at this hour," said Longchamp, his brow darkening a little.

At that moment a wild-looking figure, which had followed the two esquires from among the crowd in the outer chamber, and had stood at some little distance during Raoul's introduction to the legate, stepped in front of them with a rapid, shuffling gait, threatening every moment to trip himself up with the loose gown which trailed to his heels, and, with his long, flowing hair, gave him very much the appearance of a woman.

"Will it not please your excellent worship to listen rather to me?" said the new claimant, with a low reverence more grotesque than servile. "I have another fytte, which I promise shall content you well, of the gestes of Sir Hippomedon of Troy."

"Why, where left we the noble Trojan last, Perrinet?" said Longchamp, addressing the poet; "I remember now, there was a strange drowsiness came over me towards the end of that last recital; yet, unless I were dreaming, I thought surely he had been slain and done with."

"He shall be brought to life again by a most subtle enchantment," said the poet, bowing with an air of great self-satisfaction; "and shall make good disport yet, I dare warrant for him."

"Saints forefend us!" said the prelate hastily, "if he be not dead when he is dead, he is like to grow tedious upon us—we shall never get done with him at that rate; let him rest in peace a while, good Perrinet. Stay," he added, as the *conteur* was turning away in mortification—"here is for thy guerdon as usual, nevertheless. The joyous art shall not suffer for my dullness—or for thine either. And hark ye—since it costs greater pains, I take it, for one of such gifts to be silent than to rhyme for a couple of hours—hie to the wardrobe, and bid them give thee a new gown to thy liking."

"Thanks, noble prince," said Perrinet, as he received the legate's liberal bounty—"we might have Virgils amongst us yet, but that an Augustus comes so seldom."

"Had Virgil been like thee," said Longchamp, as he watched the shuffling figure in its retreat, "Augustus would have cut his head off. It is a marvel to me, brother," he continued, turning to Hugh of Durham, "that Heaven, in its wisdom, should endow

such men with a fecundity of nonsense! yet will he keep a table-full of roysterers listening to him open-mouthed for hours, till they forget the drink that stands before them. Come" —for Raoul was yet waiting, though he had withdrawn a step or two backward—"we will even have the young esquire's tale now; it may be something new, in any case, and can hardly be so wearisome. What says the worshipful knight of Ladysmede? Despatch, and go your ways."

"I bear no message from Sir Godfrey de Burgh," said Raoul, his courage returning as his blood still warmed at the remembrance of the knight's insult. "I am charged with a word to your holiness from a right noble lady."

"Ha! is it so?" said Longchamp, smiling; "then, my good lord, it were but of courtesy he should be heard at once, were it not? Sooth, I see now he has more the look of a lady's messenger. Speak, young sir; we are all attention."

"Pardon, my gracious lord," said Raoul, hesitating and looking round at the others—"I am not sure—it were more fitting, perhaps, that I had your private ear in this matter."

"I commend your discretion, youth," said Longchamp, smiling again, "though I am well assured it is needless. My lord of Amersham—good Sir Piers De-la-val, you may be over young for a lady's counsellor—will it please you to take seats yonder apart for a while? My brother of Durham is as mine own soul. Nay, never look demure upon the business, Hugh Foliot, nor put any such irreverent interpretation upon this fair one's message, be she who she may, as I see lighting your eye even now. Now, most discreet and prudent messenger, say on. Not a rat besides can listen."

Shortly and distinctly, Raoul delivered the Lady Gladice's request in her own words.

"Pardieu!" said the prelate, "as though it were a small thing for one man to have on his hands the affairs of a realm that is blest with a mad king and a lively breed of traitors, here I have thrust upon me the guidance of a wilful woman!—for wilful she is, like all her blood. And wherefore, under your favor, gentle sir, have your tender years been specially selected for the burden of a lady's secrets?—under which I do not marvel now that you broke down on the road."

He eyed Raoul curiously as he spoke, and used a tone of banter which banished the modesty which the youth had felt in so honorable a presence, much more effectually than the most gracious encouragement could have done.

"The Lady Gladice hath none about her own person whom she may safely trust in any matter that she would not choose to come to Sir Godfrey's ear; the men at Willan's Hope have none but him to look to for place and pay. I would she had a more fitting messenger to do her service," said Raoul, firmly; "I have no qualities that beseem such an office, save honor and good faith."

"Oh, and marvellous discretion, and a very pretty turn of words besides," said the prelate, laughing to himself at Raoul's flushed face and kindling eyes; but there was a kindly gleam in his own as he spoke, which might have soothed the youth's ruffled pride if he had found patience to have marked it. "Still, how comes it that one who rides with Sir Godfrey himself, as I learn you do, is such a chosen vessel in the damsel's eyes?—and how does your discrimination reconcile your *devoir* to the lady with your lawful obedience to the knight?"

"I had forsworn his service before I came hither, as the Lady Gladice knew," said Raoul, looking so hot and angry that the Bishop of Durham, who sat listening with some amusement to the dialogue, good-naturedly raised a warning finger; "he has a false tongue, and is neither true man nor gentle knight."

"Bold and rash words," said Longchamp, "in any mouth but in his who can maintain them. Few men of double thy summers, younker, would care to use them of Godfrey de Burgh."

"I take shame to have used them in such a presence," replied Raoul, bending low, and somewhat abashed as he caught the other prelate's eye; "but I would maintain them upon him, by your grace and Heaven's, if ever I live to wear spurs."

"Thou wilt hardly do that, friend, if thou carry that hot bearing towards all men; such tempers are not long-lived."

"I only meant," said poor Raoul, somewhat discomfited under the stern gaze of Longchamp, "that I would not have your holiness think so meanly of me, as that I said of Sir Godfrey here that which I would not

say to his face, if need were—if I died for it; I am old enough for that."

"And to live and grow wiser," said the prelate. "But having discharged yourself from the service of the knight of Ladysmede, where is it your good pleasure to think of bestowing yourself?—for you and Sir Godfrey will be but dangerous neighbors, if you take service at Willan's Hope under the lady."

"I would go to the holy wars, if any good knight would have me of his company, and serve him with all love and honesty."

"He could hardly take with him a more dangerous companion, I think—unless it were his lady-wife," said the prelate. "Not so, ooy; as you seem to have a mission to set other men right, the service of holy church, I take it, will give most scope for your peculiar qualities; and a quiet household like mine"—he glanced with the corner of his eye at his neighbor of Durham—"were just the place for your young blood to cool itself down into a little more Christian fear and reverence of your elders. What say you, sir? I did not catch your name—will ye take service with me?"

"O my good lord—your holiness!" cried Raoul, falling on his knees in a transport of delight, for there was now no mistaking the legate's kindly meaning; and to ride in the princely train of William of Ely might have been indeed a dazzling offer even to a youth of calmer spirit than his—"you are too good! too gracious!—what can I say?"

"The less the better," replied Longchamp; "but let it be said upon your feet. I am not over-persuaded that I shall come up to your notion of perfection in a master, but you will have the grace to bear with me for the present, and to do my bidding. Rest here to-night; and as early as you will to-morrow, take back my answer to Willan's Hope. In three days—or it may be in less—I am bound to Michamstede, and thence to Rivelsby; at one or other place, say from me, I will request a meeting with my fair kinswoman, and give her such counsel as I may. Ride straight there and straight back—I will send a trusty comrade with thee; and if you chance to fall in with any of Sir Godfrey's riders in those parts, say that ye serve the Bishop of Ely; and that I will have his ears cropped like a dog, be he churl, knight, or noble, that meddles with any man on an errand of mine."

Proud and grateful the young esquire made a humble obeisance, and withdrew.

This unexpected transference to the service of such a powerful patron, which filled Raoul with as much surprise as delight, and made him at once an object of jealousy to the friend who had introduced him, was not the result of quite so sudden a whim on the prelate's part as he and others present might have naturally concluded. Longchamp's generosity, it is true, was sometimes as capricious as his exercise of power; but not unfrequently his acts assumed to others the appearance of being arbitrary and despotic, because in his haughty contempt for the opinions and judgment of those whom he despised—and they were rather the exceptions whom he did not—he rarely condescended to give a reason for what he did, and often, both by his language and bearing, gave all the effect of a wanton caprice to what was really, whether right or wrong, a well-considered decision. Even in the trifling matter of young Raoul's adoption into his service, his intention had been formed beforehand, and from circumstances which few were ever likely to know. Waryn Foliot, with a kindly feeling towards the boy who was thrown in such plight upon the rude sympathies of such a household, had sent a groom to see that Raoul was cared for in the palace, and to bid him wait on him when he should feel sufficiently recovered. In the brief conversation which followed between them, Foliot drew from him at once, by some of that unconscious attraction by which hearts are opened, a more unreserved account of his quarrel with Sir Godfrey than his pride had allowed him to give either to the Italian or to the Lady Gladice. If he smiled at the boy's violence, he had the charity not to do so until he repeated the story in his uncle's chamber; the Bishop of Durham told it again to Longchamp, with some grave and regretful strictures upon the petulance and irreverence of youth in that degenerate age. But the legate—partly, it might be, that he had little goodwill towards de Burgh, but more from a strong natural sympathy with any indications of a bold and impetuous spirit—had burst into one of his heartiest laughs at the recital, and vowed that the boy had done well. He determined on the instant to send for the youth on the morrow, before he left the palace, and if his bearing pleased him, to offer him ser-

vice in his own household. Raoul's introduction to his presence that evening had only somewhat hastened this result.

It was scarcely dawn when the young esquire led his steed from the palace stables at Ely, and looked carefully, in the uncertain light, to shoe and strap and buckle before he sprang upon his back. But, early as it was, in the palace-yard he found another party already mounted. It was Waryn Foliot, with a single follower, now taking horse on his return homewards to the Leys. He greeted Raoul with ready courtesy.

"I give you good morning, sir squire—you ride abroad early."

"I thank you, worshipful Master Foliot," replied Raoul; "I have business that may not well wait."

"Lies your way towards Ladysmede?" said Foliot; "if so, we may as well travel in company. There have been tales of loose doings on the roads between this and Lincoln, and honest men can never be one too many; though, for myself, I would be bound to ride alone through the breadth of England—ay, and France too—with a light purse and a discreet tongue, safer than with a score of brawling knaves at my heels who can never keep tongue nor hand out of other men's quarrels."

"An it please you to do me so much grace as bid me ride in your company," replied the esquire, "I shall hardly be so ill-mannered as to say nay; but I have need to be in haste," he added, with a little flush of conscious importance.

"I know, I know," said Foliot, smiling; "you serve a new master, I have heard, and one that will have no laggards in his service. I give you joy of my Lord of Ely's favor; he is the foremost man in this realm, and, I will be bold to say, wears his honors nobly. I will be no hindrance on the road, Raoul, I promise thee."

So they set forth together, Raoul's happy laugh ringing again in the clear, cold air, light and careless as ever, as if his trouble had been but a dream; and before the day had worn far on, they drew bridle for the first time at an hostelry in the town of Michamstede.

CHAPTER XXI.

THE NET AND ITS PREY.

If the abbess of Michamstede had renounced the world, it was not to shut herself up in a selfish isolation, but only to open her heart more largely to those whom the world had renounced, or who had been sore wounded in their struggles with its evil. It only needed for her to learn the outlines of Isola's unhappy story—and of these Father Giacomo had informed her—to insure for the stranger such rest and protection as might be found within the walls of the convent. That she had been a grievous sinner—and, in the pure eyes of the Lady Brunhild, very few sins were more grievous than a breach of the cloister vow of chastity—was only an additional claim to the compassion of one who held her rule under the auspices of the Mother of Mercy. That she went in hourly danger from a powerful enemy, against whom even the walls of the sanctuary might prove no protection if her retreat were discovered, and whose wrath might in such cases light upon the protectors as well as the protected, was a thought which never caused the abbess an instant's selfish hesitation. It is only in ages of higher civilization that all doors are shut against the victim whom society has branded, and whom it is dangerous to protect. For this, if for no other reason, let the traveller pause before he denounces as an impious boast the legend which he may yet trace out over the ruined archway of Michamstede. "*This is the gate of Heaven.*" At least it stood always open for the world-weary and the contrite.

There was now no longer any excuse for Isola to linger as a guest in the old tower. The day was at last determined for her parting from those kind friends. Her buoyant and impulsive spirit, in which love and grief surged and swelled like a tempest, struggled out again into sunshine, under the influence of kindness, even after trials which would have laid some hearts low forever. But for the one overwhelming sorrow, which lay on her like a heavy shadow always—nay, almost in spite of it—the weeks she spent at Willan's Hope had been the calmest and the happiest of her life since early girlhood. Her new-found friends were scarcely less sorry to part than the Italian herself. Skilled in all the limited accomplishments of her age, and having been a traveller in foreign lands, she had been a very welcome companion in their secluded life. Brighter flowers than ever had sprung from Elfhild's mechanical fingers marked those portions of the eternal tapestry which had been committed to Isola's hands,

on her own petition, while the good dame was absent on her other duties of rebuke and exhortation amongst her domestics; and richer melodies than ever flowed from Gladice's careless voice rang through the old chambers, and stilled the noisy men-at-arms below, as they caught the sounds through the open doors, when the stranger could be persuaded to sing there some strain of her native Italy.

But it was full time that Isola should seek some securer and more distant refuge. Father Giacomo, in the messages which he had sent by Picot from time to time, had never ceased to urge it. Sir Nicholas, indeed, far from having any suspicion of her presence in his neighborhood, had but spoken the truth when he had told the chaplain that he believed her dead; and Isola herself had good reason to think that he looked upon her sudden appearance in Cuthwin's hut as merely the shaping of his own distempered fancy. The reception of a wanderer at the old tower was not in itself so remarkable an occurrence as necessarily to reach the ears of Sir Godfrey; or even if it had, since that wanderer was a helpless woman, and not likely to entertain any design upon his ward or her manors, it would probably have been forgotten as soon as heard. Still there was evident risk of discovery from such a close proximity; and Gladice herself unwillingly, for her guest's sake, admitted that she would be safer in the convent at Michamstede.

"Since it must needs be so," said she to Isola, when at length the day was fixed for her quitting the Tower, "I will at least give you company so far, and commend you myself to my dear friend the abbess; good and kind she is to all, and you will soon love her as I do."

"I have told you—have I not?—there is an Italian in their house—Sister Beatrix, with whom I have some poor acquaintance. I shall not be wholly among strangers there; albeit, as our holy Mother knows, strangers have surely been better friends to me than they who should have been."

"'Tis a good life the sisters lead there," said Gladice, thoughtfully; "though I remember, to my shame, I flouted at their habit and their talk, when I was there, as being over-staid and grave; but I was scarce more than a giddy child then, and the good abbess chid me, rightly. I think now sometimes it were well if I had staid amongst them."

"No, no!" said Isola, "the cloister is neither for you nor me; the peace you talk of there is but a living death."

"It were better even so," replied Gladice, quickly, "than"—but she stopped and hesitated.

"Than a life like mine, you would say? I know not. To some, such vows are but tempting perjury. Had I never taken them, I might have known sorrow enough, but I should have 'scaped the sin which is my heaviest burden."

"But at least," said Gladice, "you will find such rest welcome now."

"Rest?—for how long? Nay, whilst he lives, and I live, there is no rest for me but one, and that I must seek, though I well know it is lost to me forever. Even now—laugh at such weakness, for I deserve it—I gladly seek this mynchery, as I have gladly tarried here, because I shall still be near enough at least to hear of him!"

"I would say nothing to pain you," said Gladice, after a pause; "but surely, if he has scorned and slighted your love as you say, I do not say that, being his, you can or should cease to love him; but such love would seem to me more like a sorrow for one dead and lost, than a clinging to the living."

"Ah!" said the other, looking at her with a sad smile, "you speak of that you do not know!"

Gladice made no reply. Both perhaps found the subject embarrassing, and the conversation was not continued.

Very sadly, upon unwilling eyes, dawned at last the dark November day which was to see their parting. Almost in silence the last meal was eaten; Dame Elfhild herself assisted in mounting Isola upon her own jennet at the gate, and her farewell was as tender and as tearful as though she were addressing it to a daughter. Even Warenger was moved to a nearer approach to softness than he had ever been known to show towards any woman save her whom he regarded with a sort of epicene affection, as the suzeraine lady who had a right to his military obedience as well as to his gallantry as a man; and when the fair stranger bid him a courteous farewell as he held Gladice's rein, the veteran bestowed upon her a hearty wish for her safe journey, and accompanied it with a brief word of regret that he himself could not conveniently be of their escort that day. Attended by her maiden

Bertha, and closely followed by Cropt Harry and some half-score of the retainers of the tower, the Lady Gladice rode forth with her guest, in fulfilment of her promise, towards the friendly gates of Michamstede. It was the day before that on which she was herself pledged to accept the unwelcome hospitalities of Ladysmede; and though her silent thoughtfulness, as they rode, did not much surprise her companion, the subject of the maiden's anxious thought was even graver than Isola could imagine. She was calculating to what lengths Sir Nicholas might carry his suit even in the face of her most determined resistance, and how far, in a case of extremity, she had any hope of moving her guardian by an appeal to the rough kindness which she believed him to entertain towards her; what plea she should find for evading, as she was resolved to do, her visit to the manor; how far she could make use of the knowledge she had obtained from Isola without betraying her to her husband's anger; and above all, how Raoul might have sped in his message to the Bishop of Ely, and what might be the probability of his interposition in her favor before it should be too late. She had other and nearer cause for anxiety and alarm, if she could have suspected treachery amongst the followers of her father's household.

Dubois' silver pieces, employed with judicious liberality in his master's service, had found their way even through the strong old walls of Willan's Hope. Lambert, the groom, who was now jesting with one of his fellows with that open, smiling face in which Nature seems sometimes to take pleasure in disguising a rascal, had communicated to the Gascon, in pursuance of an arrangement which that clever negotiator had found opportunity to make during his visit to the Tower, the fact of the Lady Gladice's hurried interview with Raoul, and subsequently her intended journey to Michamstede. Nay, with the honest wish, it must be supposed, of giving good money's worth for the price paid, he had been somewhat over-positive in his information. He had stated as a fact, what was merely a report in the household, that their young mistress had at length determined to take the veil at the instance of her ancient friend, the good Lady Brunhild. Carried to Sir Nicholas' ears, the tale bore every mark of probability. Raoul, then, had communicated his suspicions to Gladice; a woman's instinct had led her to guess at Sir Godfrey's designs; and she had at once chosen the cloister as an escape from an unwelcome marriage. It doubly confirmed Le Hardi in his determination to play his own game boldly—at once, and alone. He would no longer be hampered either by Sir Godfrey's half-pretended scruples, or his unmanageable temper, or his clumsy diplomacy. A brief consultation with Dubois was all that he now required to arrange his plan; and before the day had well broke on that gloomy morning which was to be the last of Isola's sojourn at the old tower, Sir Nicholas himself, in plain armor, with his visor down, accompanied by the few trusty followers of his own who lay at Ladysmede, rode quietly out at the gate of the manor, and was joined in the valley below by about the same number of military tenants of Sir Godfrey, who were quite ignorant of the business on which they were engaged, and quite indifferent on that point, so long as they received from Dubois such weighty and intelligible personal reasons for undertaking it. He had previously given Sir Godfrey to understand that the object of this early expedition was to visit a religious house at some distance, which had been backward in its contributions to the royal service; and he had caused the report to be spread through the household, in pursuance of the plan of action originally agreed upon, that he was now taking his final departure from Ladysmede. In the event of his finding himself misinformed as to Gladice's movements, and of her yet becoming Sir Godfrey's guest, it was not his intention to show himself again at the manor until after her arrival there. It was possible that by this means, if the intelligence of his actual departure should reach Willan's Hope, any vague suspicion which might have been roused in the mind of the heiress would be set at rest; while at the same time it offered a plausible reason for taking with him his own immediate followers, whom he would find the readiest instruments in the design which he now contemplated, if Dubois' last information proved true. And if that design succeeded, Sir Godfrey would rejoice to find it carried out without his own actual knowledge or co-operation.

When the knight's party reached the cover of the woods which lay between the manor and Willan's Hope, they halted, by Sir Nicholas' order, in one of the little intersecting valleys, and dismounted and watered their

horses at the stream which ran through it, while Dubois rode forward alone. Striking off from the main path into one of the many tracks made by the hunters and swineherds, he soon reached a secluded knoll, which commanded the approaches to Willan's Hope, and from which he could easily discover, although still at some distance, the figures of any persons entering or quitting it. Throwing himself down upon the turf, with his bridle over his arm, while he allowed his horse to crop the herbage within his reach, he kept his eyes fixed steadily upon the old gray walls. More than an hour passed, and still he saw there no sign of movement. But one of the Gascon's best qualities was patience; at last it was rewarded. He saw plainly a numerous party cross the drawbridge, and as the figures were thrown out strongly against the sky, he could even make out more than one female dress amongst them. Continuing his observations until the forms grew indistinct as they descended the slope, he remounted, and took his way back rapidly by the same path to the valley where he had left his master. He did not know that the movements of his own party had been already watched by as keen an eye as his own, and a subtler and more determined spirit.

Slowly, and almost in silence, the company whose departure Dubois had been watching, rode on their way. The heavy skies wore looks that harmonized with their feelings; and as the collected mist dropped on them as they passed under the overhanging branches, Gladice drew her mantle closer round her with a shudder, not so much from physical discomfort as from the chill of her inward foreboding of evil. Lambert, who had charge of the party, led the way at a leisurely pace, which at most other times he would soon have received orders to quicken; but to-day Gladice was content to let the dull hours drag on as they would. They had not proceeded far, when, from the thick covert by the wayside stepped out a man in a yeoman's russet dress, carrying an axe upon his shoulder. He was a stranger in the younger lady's eyes; but Isola had no difficulty in recognizing Giacomo. Cropt Harry, too, who scanned him as he stood waiting for the cavalcade to approach, soon knew him for the same man who had assisted Picot to bear the sick lady into the tower on the night of the storm. He made a slight but courteous obeisance to Gladice, and then, stepping to the side of Isola's horse, spoke a few words to her in their own language. The retainers of Willan's Hope looked somewhat scandalized at the interruption, and watched their lady's face to see what notice she would take of the stranger's boldness.

He had turned from Isola, and laid his hand on Hengist's mane, while he addressed the fair rider earnestly, in a tone which scarcely reached the ears of the others.

"Lady," he said, "the fate which you would avoid follows fast behind you. Ask me not who I am, or by what right I speak; but turn with me, and ride; it is for more than life!"

"Trust him, oh, trust him!" said Isola in a low voice of painful eagerness, as Gladice drew back from Giacomo, naturally startled and alarmed.

"Yes, trust me," said the Italian, "and turn at once. You may be safe yet, if we lose no time. To the right here; follow me!" and he pointed down a narrow by-path.

"By the mass, my lady!" said Lambert, who had listened attentively to what he could gather of the conversation, "you will surely not be so ill advised as to turn aside at this man's bidding?"

Gladice looked at Isola, who repeated her entreaty with an impressiveness which overcame at once her own scruples of mistrust.

"He is known to this lady, and he advises us of danger, though I know not what," said Gladice; "let us turn while we may."

But there was a murmur of dissatisfaction on the part of more than one of her other followers. They prudently considered that their new travelling acquaintance might as easily lead them into peril as out of it.

"There be little danger afoot between this and Michamstede," said one, "to a stout band such as we are; and who is this ill-boding churl, that we should hearken to him?"

Encouraged by this show of unwillingness on the part of his fellows to listen to the stranger's warning, Lambert now turned round and addressed his mistress.

"It were folly to listen to him, lady," said he; "let us ride on, and we will be warrant for your safety."

"Rather turn at once, as I bid you," said Gladice with a shade of haughtiness in her voice, as she half turned her own horse to follow Giacomo, who was still beckoning them

impatiently to the path which he had pointed out.

"Look ye here, Harry, Turstan, and all of ye," shouted Lambert, "we shall have to answer to Master Warenger for the safe rendering of these ladies at Michamstede. I would be full loth," he continued, bowing respectfully to Gladice, "to do aught against your worshipful pleasure, but we must not be turned unduly from our path at a fool's fancy—even if it be no worse, as it well may be. Stand off, sirrah!"

And forcing himself between Gladice and the Italian, he seized the rein of her horse, and urged him forward. He was seconded in this by one or two of his companions, who had crowded up, and Giacomo would have been ridden down if he had not stepped back hastily amongst the underwood.

"Ride on, if you will," cried the Italian; "there is danger before you and behind!"

Lambert raised his curtal-axe with a menacing gesture towards the stranger, as he spurred his own horse forwards. "Away, fool!" he shouted.

They were the last words he spoke. The next moment the axe fell from his hands as he threw them wildly upwards, his head bent forwards towards his horse's mane, and with a single sharp cry he dropped dead from the saddle, an arrow through his heart.

The consternation of the party gave the priest another opportunity. He alone was calm and unmoved.

"Back!" he cried to the men who had reined up and were handling their weapons in anticipation of an encounter with some unseen enemy. "Back! if you would save your lady!"

Gladice had uttered one faint cry as she saw Lambert's fall, and now sat pale as death, trying to soothe Hengist, who had been chafed by the groom's rough handling. Isola kept her alarmed gaze fixed upon Giacomo.

"Said I not your path was beset?" he continued, almost with a sneer, to the bewildered escort; "will ye turn now?"

"Beshrew me, if thou hast not more hand in this thyself than shall be good for thee," said one of the men-at-arms, making towards the speaker. "If we be fallen into thieves' company, I trow I can mark one."

"Hold!" cried Gladice—"I know him for a friend who gives true counsel."

"Nay, Turstan," said Cropt Harry, "be not over hasty—list to what the Lady Gladice saith. There be others in the company who know somewhat of this stranger, too. If my lady says 'follow him,' why I follow him for one; and it were best for us all, rather than bide here to be shot down like driven deer."

The priest had sprung into the groom's vacant saddle, and before the party had come to any resolution, led the way at a rapid pace through the oak coppice, followed closely by Gladice and Isola. Harry kept his place almost at his lady's stirrup, and one by one, with some muttered reluctance, and many an unquiet glance round them, the rest of the escort turned their horses in the same direction. Just as they reached the edge of the wood, and were about to emerge into the open country, Giacomo rode forward cautiously, after giving the others a signal to halt. They obeyed him now as if he had been their recognized leader.

"There is nothing left but to ride for it," he said, after watching anxiously for a few moments the line of wood which skirted the distance in the direction of Ladysmede. "See there!" He beckoned Harry to him, and pointed to the quarter in which he had been gazing.

"I see a plump of spears, sure enough," said the other.

"They are on our track, and there are those amongst them who know these woods as well as I, or we might perhaps baffle them here. It were as well for thy lady to die," said the Italian in the other's ear, "as fall into their hands."

The man looked round him in dismay. He did not half understand his companion, but he understood enough to feel helpless and uncomfortable.

"We are but eight or nine at most," he said, looking doubtfully at his new comrade.

"And I can count above a score of spears yonder," interrupted Giacomo.

"But we may hold them at bay a while, if thou ride on with my lady to Michamstede. I know naught of ye, friend," continued Cropt Harry, bluntly, "but I have seen thee show tenderness to one woman, and I wot that be the best safeguard against wronging another—specially such as her." He nodded over his shoulder towards Gladice, and there was a rough emotion in his tone.

"They will have beset the road to Michamstede already," replied Giacomo, "unless the

fiend hath bestowed upon them less of his cunning than usual. Our best chance is to put the river between us."

He turned, and hastily communicated his purpose to Gladice and Isola. "You cannot reach the mynchery," he said; "you were scarce safe there now, even if you could."

"What must we do?" asked Gladice, shivering and trembling. She feared to ask what the danger was, or whence it came. If her suspicions were true, and if the enemies of whom their companion warned them came from Ladysmede, she knew—and the priest knew also—that even those who were now escorting her were hardly to be depended on.

"We must make for the river," said he, calling to the others. And, followed by the whole party, he left the cover of the wood, and led the way at full speed in that direction.

They had not galloped for many minutes before he drew rein again for a moment on the edge of the valley, and threw a long, keen glance behind him.

"They gain on us fast," he said; "and there go some to cut us off from Swinford bridge."

"Now, our Lady help us!" said Gladice; "we can go no faster." She glanced behind her, as she spoke, at the panting animal which carried Isola, and which, though forced to its utmost speed, could not keep pace with the noble horse on which she herself was mounted, and which might yet have borne her out of the reach of her pursuers. Even now, fiery with the excitement of the race, she could scarce rein him to the pace of the others.

Giacomo saw the difficulty. "Bertha," said he, turning to the handmaiden as they still rode on, "dost thou love thy mistress well enough to do a brave deed for her?"

"What a woman may do, I would," replied poor Bertha, crying and trembling.

"I ask nothing that endangers thy safety or thine honor, maiden—at least more than they are in danger now. If we hold all together, we cannot fail to be overtaken; if we separate, some will lightly chance to escape. It is the Lady Gladice whom these men seek. Don thou her hood and mantle, mount on this good steed's back, and some of us will ride with thee straight for the mynchery. If we reach it, well; if they take us—why, they have missed their quarry after all. The lady herself shall make for the ferry afoot meanwhile."

"Holy St. Bride!" said the poor tirewoman, with a fresh burst of tears; "what will become of me?"

"Nay, nay!" said Gladice, who overheard something of the proposal, "she shall go in no such peril for me."

But here Isola spoke. She had been very silent, and looked flushed with a wild excitement which contrasted strongly with Gladice's pale face of despair.

"Stay," she said, "this service is mine." She spoke in a determined voice, as one who had made up her mind. "I will do that which the girl hath been asked to do—I have no fear."

"What!" said Giacomo, starting, "there were little risk for the damsel—but for you!"

"Let it be even so," said Isola, pressing to his side and laying her hand hurriedly upon his arm—"quick, or we lose time."

Gladice looked from Isola's excited face into the priest's, and then again around her in an agony of doubt and hesitation.

"Nay, then," said the Italian, after another imploring whisper from Isola, "have it as you will—there is peril alike every way—let that come which will come."

They had dipped into the valley while this hurried conversation passed, and were for the moment out of sight of their pursuers. Before Gladice could well rally her thoughts, and in spite of her faint remonstrance, Giacomo had stopped and dismounted, lifted her from her horse, and, with Isola's eager help had made a rapid exchange of hood and mantle, and seated the Italian upon Hengist's back. She, at least, showed now no trace of fear; and as she sat there, soothing the impatient and yet gentle animal, with her color higher and her eye brighter than its wont, she looked as though peril and excitement had given her a new life. Was it that she dreaded the capture even less than the convent?

"Now," said Giacomo, when their hasty preparations were complete, "ride straight across the open yonder for Michamstede; you at least might reach it, if the way were clear—but of that there is little hope. Bertha, and all of ye—if ye love your lady's safety, ye must be content to part with her for a while, and ride on with us. I am loth to rob the Lady Gladice of her following, but if she were mistaken for a serving-wench, she were

all the safer now. If she will be ruled by me, she will seek the ferry yonder—'tis scarce two miles—on foot, and alone."

"That shall she not," said Harry, "come what may of it. Afoot or a-horseback, dead or alive, I go with my lady there till she get safe home again."

"Such a fool's speech had need to come out of an honest man's mouth," the priest muttered, half to himself. "Go thou with her, then, if it must be—two may be as safe as one. Make fast the horses to these trees, and see ye keep the shelter of the wood-side as much as may be. If ye once win the ferry, pay the ferryman to cut his boat adrift, and ye may take your way at leisure on to the Abbey of St. Mary—ye will be safe there."

He thrust some money hastily into the retainer's hand, sprang on his horse again, and followed the rest of the party, who were already spurring on towards Michamstede.

The ruse was so far successful. When the spearmen whom Giacomo had been watching had reached the crest of the hill and looked before them into the valley, they saw what seemed still the same objects of their pursuit, though they had turned somewhat out of the usual track, taking their expected route towards Michamstede, the towers of which were now visible in the distance. That they had been startled at the appearance of a body of armed men riding apparently upon their track, and had quickened their own pace in consequence, was nothing more than one of the ordinary incidents of travel in such unquiet times.

Sir Nicholas rode on, not caring to overpress the horses of his band, though the fugitives seemed now to be gaining upon him in their turn; for, as Giacomo had suspected, he had already taken measures to intercept them before they should reach the bridge which led into the town. The object of his bold attempt seemed fairly within his grasp; for he could make out in the distance two female figures in front, one mounted, as his practised eye almost assured him, upon the Lady Gladice's noble black horse; and this corresponded sufficiently with the account which the Gascon esquire had brought to him of the party who had set forth from the gates of Willan's Hope. If the figures of Gladice and her single protector were visible occasionally as they wound their way from coppice to coppice towards the ferry, the attention of the knight and his followers was too eagerly fixed elsewhere to be easily attracted in their direction.

With a mixture of tumultuous feelings, of which even she herself could have given little account, rushing through her heart and quickening its pulses almost to madness, Isola let the reins fall loose upon the neck of the gallant horse she rode, and was borne along almost unconsciously. She could scarcely have explained the motive—or rather the sudden impulse—which prompted her thus to assume Gladice's place; but she never repented of it for a moment. Something there was, no doubt, of a noble self-devotion, which would readily offer itself to meet the danger, be it what it might, which threatened her benefactress. She would have done and dared much for one who had such claims upon her love and gratitude. But, warm and true as her feelings were towards Gladice, the Italian herself was conscious of little self-sacrifice in the service which she had volunteered, and was too honest to claim, even in her own heart, the self-satisfaction of thus repaying a kindness. Had she been questioned when she first left the tower, she would have shrunk with dread from the thought of falling once more into the power of her husband; but now, as she gradually neared the gates of Michamstede, the refuge, as she might still hope, from all such danger, she felt an almost irresistible longing to stop, and meet the man who had so deeply wronged her—whom she still so madly loved—face to face, if her last appeal were only to die at his feet. He could but slay her; and what was life without love but death to her? There was something also—she confessed it in her heart, and sought to cast it from her—of a darker and more unworthy feeling; a bitter desperation which, at the price of life itself, would have stood between him and another.

Left thus to himself, and still ahead of the rest, her horse had slackened his stride, and enabled Giacomo with some difficulty to rejoin her.

"We were safe now," he said, as he looked back, "if we had foes behind us only. But this was wild counsel, Isola—I cannot read what will come of it."

"I said I was weary of this life," she re-

plied. "It may be I have wronged him somewhat, after all; he will surely have forgiven the dead!"

"Ay," said the priest, "but will he forgive the living? But let it be—I, too, have had long patience, and am weary too; it may be we are near the end."

"My Giacomo!" said Isola, in a voice of terror, as she tried in vain to look into the dark face that was turned away from her—"my brother!—you would not kill him!"

"No!" said the priest; "not if I may avoid it. I seek no man's life—not his, of all men, if but for thy sake, Isola—but ride on."

There was still a chance, which the Italian's prudence did not care to lose, that they might find the approach to the town unguarded, or that, by one of those accidents which often mar the most subtle combinations, they might escape any party who had been charged to intercept them. For near a mile they rode on again, their pursuers gaining but little ground, when their last hope of reaching the convent gates unmolested was destroyed at once. Five horsemen, fully armed, made their appearance suddenly on the right of the fugitives, and drew across the road in such a position as to leave no doubt of their intention to dispute the passage.

Giacomo cast a glance behind him, and saw that although he and Isola had maintained their ground in advance of their pursuers, most of their escort, not so well mounted, were slowly dropping to the rear, and that the hindmost were likely to be speedily overtaken by the hostile troop, whose shouts could be now plainly heard, as they caught a nearer view of the chase from a rising ground, and came down upon them in good order with levelled spears.

He drew his horse up, and calling to Isola, pointed in silence before and behind them.

"Who be these in front, in the Devil's name?" said the man called Turstan, as he rode up to Giacomo's side.

"They are near of kin to those behind us," said the other, quietly. "It is as I said."

"We will ride through the knaves, be they who they may," said the man, boldly. He turned and shouted to his comrades, and laid his spear in rest.

"With our jaded beasts, and these women in our company?" said Giacomo. "No, no, friend; it were a waste of good blows, and thou mightst chance to get small thanks for it. See—those behind would be upon us before thy fellows could well come up. We are beset front and rear; and if I may give counsel to a soldier of such experience, I would say, halt, and inquire their purpose peacefully."

Bred in Warenger's rough school, and having been foremost in many a desperate fray under Sir Amyas, the man-at-arms saw in the prospect of a fight, provided the odds against him were not unreasonable, nothing less than an adventure sent providentially to break the quiet life which he had led perforce, during the last twelve months, under the rule of the heiress. Yet, when he saw his fellows straggling up one by one, and marked how short the space was which divided them from their pursuers, his soldier's sense forced him to admit that the stranger's counsel was the wiser. Even with their own slight advantage in numbers, there would be little chance of their clearing their path to Michamstede, if the party in front of them made any kind of stand, before those in their rear would arrive to take their part in the combat, and so turn the scale fearfully against himself and his companions.

The horsemen who seemed thus to bar their approach to the town, had ridden slowly forward, and were shouting to Giacomo and his company to stand. But now one of them, who was somewhat in advance of the others, observing tokens of a hostile intention on Turstan's part, put his lance in rest also, and galloping forwards, summoned him fiercely to surrender.

Such provocation was more than the disciple of the gentle Sir Amyas could bear. Turstan, in spite of Giacomo's renewed protest, dashed out to meet him with a wild yell, which seemed to express the concentration of all his long-restrained ferocity; and though his overpressed steed visibly staggered as he closed with his adversary, the latter went back over his horse's crupper, shield and breastplate pierced through, while the rider of Willan's Hope passed on, waving in exultation the shaft of his broken spear.

Then began a wild and irregular skirmish, which at its outset the Italian tried in vain to check. Turstan's companions who were near enough rode wildly forward, shouting madly in exultation at his exploit, and trying to force their own passage, heedless of the wo-

men who were dependent on their protection, through the small party who now closed to intercept them. Hengist tossed his noble crest in great excitement, and would have carried his rider at once into the thickest of the danger, had not Giacomo seized his rein, and turned him aside at the moment.

But almost before the last stragglers of the band from Willan's Hope could come up to the aid of their comrades, who, in spite of Turstan's gallant example, found themselves more than matched by the fresher horses and more complete armor of their antagonists, the main body of Sir Nicholas' party (amongst whom was the knight himself, though Dubois was their ostensible leader), who had pursued them from Willan's Hope, and who alone outnumbered them two to one, were closing in upon their rear, and would soon have made any effectual resistance hopeless. Isola's horse had again become almost unmanageable, and Giacomo had some difficulty in retaining his hold. Bertha, half dead with terror, had drawn up on the other side of the priest, as her only hope of protection, and now broke out into an audible wailing.

Suddenly the combatants in front seemed to pause by mutual impulse, and to fix their whole attention upon a fresh party of horsemen who at this moment issued from the gates of the town, and crossed the narrow bridge. The new-comers were evidently regarded by both sides with doubt and suspicion. They themselves, indeed, had stopped, and seemed at first to be watching the state of affairs in front of them with a laudable disposition not to interfere in a strange quarrel. It was Raoul and Foliot, who had arrived thus far on their journey in company, and were about to separate on their respective paths. Lightly armed and accoutred, it would have been madness for them to rush into such a conflict without urgent cause. But no sooner did Raoul catch sight of the black horse and its rider, who had at first been hidden from their observation by the movements of those who were engaged in front, than, without giving his companions any further notion of his meaning or intention than an eager cry of "It is she!" he dashed forward through the combatants, who made way for him in puzzled astonishment, not knowing whether he came as friend or foe, towards the group in which he had made out, as he thought, the figure of the Lady Gladice. Waryn Foliot did not in the least comprehend the young esquire's exclamation; for even during their journey together, Raoul had maintained a scrupulous reserve on the subject of his own confidential mission, the importance of which he himself was by no means inclined to underrate; but it soon became evident—for Bertha's lamentations were sufficiently audible—that in the confused *mêlée* in the distance were women in distress, and, bidding their attendants follow him, Waryn too rode forward, though in less headlong fashion than his companion, and, like him, passed unopposed either by Turstan's party or their antagonists.

But almost before even Raoul's impetuous speed could bring him to the spot, a change had taken place in the position and intentions of both parties. Dubois and those who followed him, taking no notice of the two or three of the Lady Gladice's late escort, whom he passed in his career, and who very pardonably shrank aside from an encounter with this superior force, rode straight at the group which was composed by the Italian and his two terrified companions. Hengist broke from Giacomo's hold, and, finding Isola's trembling hand wholly powerless to guide or control him, galloped off in the direction of home. Giacomo, after an instant's hesitation, gave his own horse the spur, and followed her. Bertha, wisely thinking, perhaps, that such a course promised best to take her out of the immediate danger, made after them as well as she could. Hengist's speed promised even now to carry off his rider safe from all her pursuers, when Sir Nicholas himself, who had hung somewhat in the rear of his own party, but had never for an instant taken his eyes from the black steed and its rider, dashed off at an angle so as to intercept Isola's course. With this advantage, a very few moments brought him up to her side; but even then Hengist held on, and though the knight pressed his own powerful horse to his utmost, he could do little more than keep pace with the object of his pursuit.

The combat was over. Foliot and the others had come up only to find Raoul lying on the ground, bruised and half stunned, and one of the followers of Willan's Hope standing over him, and rudely endeavoring to get him to his feet. Dubois had met and unhorsed him as he bore down upon them in his headlong charge, though he checked in mid

descent the blow that might have taken his life, as he suddenly recognized, with some surprise, the well-known features. Then, as he turned round, he saw the black horse rushing off, and his master's instant movement in pursuit. Sounding a small horn which he carried at his girdle, and shouting loudly to his comrades to follow him, he, too, dashed off once more upon the track of the fugitives, leaving the retainers of Willan's Hope well content at their deliverance, and little inclined to follow up the adventure in the vain hope of rescuing from such strong hands a lady who had no especial claim upon their service. Turstan, who alone of all the party would perhaps have held on to his enemies, few or many, with bull-dog pertinacity, was now himself dismounted, and leaning on his broken spear with the blood trickling from an ugly wound in his shoulder.

The Gascon rode on, his men following him as they could, and passed, without further notice than a glance of contempt, the poor tirewoman and the yeoman (as he seemed) who rode in her company. He had the higher game in view; and he well knew it was his master's wish to attain his object without more recourse to violence than was absolutely necessary. Besides, it was no time to draw bridle now, even for the purpose of engaging a more formidable enemy; for already the distance was increasing which separated him from his master and the fair fugitive.

Those two still rode on, almost side by side, though Isola was still a little in advance, Hengist growing more and more excited by the sound of his rival's hoofs behind him, though both the gallant horses, thick-breathed and kept longer at their speed than usual, began to labor in their stride. At last the crusader found himself near enough to reach forward and grasp the hand which held the bridle rein.

"Yield thyself, fair lady!" he cried, in a tone that might have been meant either for courtesy or triumphant banter. "Yield—rescue or no rescue, prisoner of mine!"

Isola had kept her head bent upon her breast, and the veil which hung from her headdress nearly concealed her features. But she raised it a little as he spoke. She was not startled at the voice. Though she had not recognized Sir Nicholas amongst her pursuers while at a distance (for he had worn purposely plain armor like the rest), nor had seen his movement to cross her course, she had felt an instinctive consciousness of who it was behind her. She longed, yet dreaded, now to see his face; she half turned to look at him, but his visor was down. She felt his grasp tighten on her wrist, as he tried in vain to check her speed. She had herself no power to stop, even had she wished it. Sir Nicholas shifted his hold, and caught her rein close to the bit. The sudden jerk brought the horse partly round, and at the same moment the veil blew aside, and Isola looked him in the face.

He retained his grasp for a few seconds, and through the bars of his helmet looked at her fixedly, while neither spoke. Then he dropped the rein, and Hengist, now freed from all restraint, tossed his head exultingly, and continued his career. But the knight's horse gradually slackened his pace, and feeling no longer either spur or bridle, after a few strides stopped, and like a well-trained beast stood still. His rider sat motionless, save that he raised his hand to lift his visor, and, disclosing a countenance pale and ghastly as if it were of the dead, gazed with a dull, fixed stare at the flying figure before him. Then he leant his hand heavily upon his saddle-bow, and seemed for a moment as if he could with difficulty support himself in his seat.

Thus he sat when Dubois came up, and looking in his master's face with some astonishment, inquired if he had been hurt in the late confusion? Sir Nicholas was long before he spoke; and then he made what seemed to his esquire but an incoherent answer.

"I have seen her, Dubois," said he; "I have seen her again."

"Seen her?—seen whom? What mean you, Sir Nicholas?" said the Gascon.

Le Hardi only answered him by a look; but there was an expression of such horror in it, that a shade of pallor seemed to pass over Dubois' hard-set face.

"You are faint, my good lord," replied the esquire, but in a less steady voice than usual; "this is but the old fancy. But the lady yonder will escape us yet, unless we both spur on."

"Hold, Dubois!" said the knight, laying his hand upon his esquire's shoulder, "yon is

not the Lady Gladice. It is—it is some fiend, I believe for a verity, that has taken her shape to juggle me!"

Some of Sir Nicholas' followers had now come up with the speakers, as much surprised as the esquire had been to find that the knight had desisted at such a moment from the chase which he had followed so long and patiently. It did not suit the Gascon's discretion to continue such a discussion with his master in their hearing.

"Sir Nicholas is mortally faint," said he to the first man who rode up. "Some of ye go seek some water; there will surely be a spring down in the gully yonder." And while he despatched them upon this errand, he himself assisted the knight, who received his services almost unconsciously, to dismount, and proceeded with a show of officiousness to unlace his helmet. It gave the knight time at least to recover something of his lost composure.

"Will it please you, Sir Nicholas," asked the esquire respectfully, as soon as he saw that he might hope for a coherent answer, "that we should continue the pursuit—or shall these good fellows go their ways back to Ladysmede?"

"Let them go, Dubois; there is no further need of their service."

"And for ourselves?" asked the esquire.

"To Michamstede—we will lie at Michamstede to-night."

Giacomo with the helpless Bertha still following him, had drawn a little aside to avoid Sir Nicholas' riders, and proceeded at a more deliberate pace in the direction in which Isola had been carried, while he watched anxiously the result of the crusader's pursuit. A smothered exclamation of relief broke from him when he saw her final escape; and when he found that both parties had drawn off from the combat, and that there was no further intention either of attack or pursuit, he gradually quickened his speed, and followed Isola's course towards Willan's Hope.

But as he gained the cover of the woodlands again, he heard his own name uttered by a voice in the thicket behind him, and checked his horse for a moment as the speaker stepped out cautiously into view.

"That was a good aim of thine, and well sped, Picot," said he to the hunter; "the Lady Gladice owes thee thanks for ridding her of a false servant."

"Thank me no thanks for that arrow," replied Picot; "I promised thee a shot to-day, Father, if need were; but I had an old mark of mine own set there of long time. Lambert of Willan's Hope shall scarce fright an honest man's daughter in the Dere woods again."

The Italian only waved his hand hastily in reply, and had ridden on before Picot had ended.

When Raoul had recovered from his heavy fall, and found himself but slightly hurt, he looked round him eagerly for the rider on the black steed. But Waryn had already learned from the men of the lady's escort—though theirs was but a confused story, for the whole of the day's adventures had been to them a mere bewilderment—that Gladice, thanks to the stranger who had given them warning, had already made her escape, as they believed, to Rivelsby. Raoul, after some difficulty in persuading himself that the lady whose rescue he had so gallantly attempted was not she, determined to ride round to deliver his message if he might, at the abbey; and thither, not choosing to quit his companion on a road which now appeared so dangerous, Waryn Foliot accompanied him.

CHAPTER XXII.

THE ESCAPE.

THE river Ouse, whose sluggish stream wound for itself a serpent-like path through the rich meadowlands between Michamstede and Huntingdon, passing in its course the wide domains of Rivelsby, which extended for some miles on both sides its banks, until on the left they were met by those of Ladysmede, formed for great part of its course an almost impassable line of demarcation. There was a rude horse-bridge at Swinford Mill, some three miles above the Manor; but from this place to Brock's Ferry, where the river took a bend after it left Rivelsby, towards the town of Michamstede, the broad stream was only to be crossed by swimming, thus cutting off all ordinary communication between the lands on either bank for a distance of full five miles. "Evil Sir Hugh," indeed, in days past—one who allowed few hindrances, divine or human, moral or physical, to stop him in his course—was said often to have swam his horse across, by night and day; but as the same wondrous steed was credibly reported to have carried him in safety across a bog in which two of his pursuers, following him by the

treacherous moonlight, disappeared forever, horse and man, and where none save Will-o'-wisp was ever known to find footing before or since, he must plainly have been an animal of unusual blood and capabilities; and if the same current report spoke truly of the price which the knight paid for him, and the quarter in which he made his purchase, there were few amongst his neighbors, however they might admire the animal's performances, who either envied Sir Hugh his acquisition, or would have cared to venture into the same market. At present, the depth and breadth of the stream, and the impracticable character of the banks on both sides, would have deterred any but the very boldest rider from attempting such a feat.

When, therefore, the lady of Willan's Hope and her faithful follower had cautiously made their way to the ferry unobserved by Sir Nicholas' riders, and found the old fisherman, who eked out a very uncertain living there by carrying passengers across, busied in washing his eel-baskets, with his boat on their own side of the river, they felt themselves in comparative safety. Once fairly across, and the boat secured, all probable danger from their pursuers on the other side was over. A short two miles by the river-banks would take them to the friendly gates of Rivelsby. It was true that even the sanctuary of a religious house might be little regarded, in such a case, by an unscrupulous wooer like Sir Nicholas; but, unlike the Lady Brunhild—who, if spiritual terrors should fail her for the defence of her house, had no secular arm to resort to but such as a lame bailiff and a few ancient serving-men could supply—the abbot of Rivelsby was known to have stout retainers of his own, both within and without the abbey walls, bound to do battle in defence of all its rights and privileges; and in the days of its past abbots, the church of St. Mary had not been slow, in dealing with the lawless barons who were its neighbors, to call in carnal weapons against those upon whom ecclesiastical censures seemed to fall harmless. None knew, perhaps, so well as Abbot Martin, how seriously the misgovernment of his immediate predecessor had injured the abbey in this vital point of strength, as well as in the matter of revenue; for the military tenants in many cases had either so successfully opposed all demands for suit and service, rightful as they might be, under his supine administration, as to have established for themselves a complete immunity, or had purchased exemption by the payment of a composition which had gone into Abbot Aldred's private purse. Still, the actual force which Rivelsby might put forth in self-defence, on any urgent need, was considerable, although the superior was conscious that it would never enable him to hold his ground, with any hope of success, against the open hostility of his powerful neighbor at Ladysmede.

Gladice had borne up nobly during her anxious and toilsome walk, creeping, as they had done as much as possible, through the brushwood in order to avoid observation; and Cropt Harry, who had tried as they went along to administer consolation and encouragement after his own rude fashion, had found that not only were his lady's powers of endurance somewhat greater than he had imagined—for the charge of a lady on foot was quite out of harmony with his views of the fitness of things—but that her presence of mind in danger was considerably greater than his own. But now, when at last the ferry-side was reached, she sank upon the bank, exhausted by the reaction of feeling, at the thought of being now freed from at least the imminent and pressing danger of the last hour. The ferryman was surly. Like many other perverse human beings, he chose to affect indifference towards that which was really the main object of his life. Passengers, in these winter months, were few; and though he was bound by his tenure under the abbey to carry across all persons who should claim his services for a certain small fixed fee, he had already noticed, as he looked up with a side-long glance from his occupation, something in the lady's dress and appearance, in spite of her half-disguise, which might have led him to hope that in this case he should not be stinted to the poor ordinary payment. Time was of little value to him, and he did not care to consider what might be its importance to others. He went on washing his baskets, therefore, without taking any notice of Harry's demand for a passage, further than by an inarticulate growl of intelligence. The honest serving-man felt that even now time might be precious, and was becoming considerably exasperated at the old man's perverse show of indifference.

"Come, leave that, and bestir thyself," said he at last impatiently, "the eels may wait

a while, I warrant; they will be less in a hurry for thee than we are."

The old ferryman looked up again at them, and then seemed to apply himself to his present occupation more perseveringly than ever.

"This passes all," said the other, stepping hastily forward towards the stump where the little boat was fastened: "wilt pull us over at once, old dummerhead, or must I do a turn of thine office for thee?" And he proceeded to undo the moorings, while the old fisherman at last rose slowly, grumbling, from his baskets.

The raised tones of Harry's impatient expostulation drew upon him a notice which he would have gladly avoided even at the penalty of waiting the old man's leisure. Two men had been walking slowly along the river bank, leading their horses, hidden from the view of the two fugitives by the thick alder-beds which lined the stream here and there on both sides. They were some of the small party who had been detached by Le Hardi to cut off the escape of Gladice by Swinford Bridge, in the possible case of her escort making in that direction for safety, if any premature alarm was taken. They were now leisurely returning, satisfied that no further pracautions were necessary in that quarter, since the chase had evidently taken the road to Michamstede, and expecting shortly to hear or see something of its successful result. The ferry, as being used by foot-travellers only, had not occurred even to Dubois' calculations, if indeed it was even known to him. When the attention of the men was now attracted by Cropt Harry's loud and impatient voice, it was rather an idle curiosity which quickened their steps in his direction than any suspicion that the object of their expedition was at that moment on the point of escaping them so easily.

When, however, they came suddenly in sight of a female figure seated on the bank, and a man hurriedly loosing the boat with the evident intention of crossing, one of the two, as if some hasty thought had struck him, threw his rein to his companion, and ran forward, calling loudly to the ferryman and to the two fugitives to stop. The first-named deliberate individual did not need to hear such a caution repeated. Upon the man-at-arms it produced, as was to be expected, the very contrary effect. No sooner did he become aware of this new interruption, than grasping his lady's arm almost with violence, and pointing breathlessly to the man who was running towards them, he half led, half carried her into the little boat. He had seated her in the stern, and seized the oars which lay at hand on the bank, without any attempt at opposition from the old ferryman, who seemed to consider a literal compliance with the injunction to stop as great an exertion as could be expected on his part. He had leapt into the boat himself, and was leaning forward, trying to cast off the moorings, which in his anxious haste seemed as if purposely complicated, while the other man was now within a few paces of the bank.

"Stop him, fool!" the latter vociferated to the ferryman—"Stop him!—or it shall be worse for thee!"

The old man shuffled forward, and laid his hand upon the boat's gunwale, drawing her in again a little towards the side. Those few seconds brought the pursuer within reach. It was no time for half-measures; the fastening was loosed at last, and in another moment the boat would have swung free from the ferryman's precarious hold. The heavy sword which the man carried drawn in his hand flashed down upon poor Harry's head as he leant forward in the act of casting off the rope, and he fell across the gunwale with his face in the water.

But the boat was off. Pale, and with wild eyes, but lips set hard to repress the cry of terror that would almost break, Gladice had risen, and grasped one of the oars. She had vainly tried to intercept with it the blow which she saw aimed at her faithful follower; but at the moment that he fell, she had plunged it with a despairing energy against the bank, and the strong current rapidly swept the little boat, once started, towards the middle of the stream.

The shriek which Gladice had with difficulty suppressed broke out into an hysterical expression of relief when she saw her poor retainer struggle with some difficulty into an upright position, and, though with the blood streaming down his face and neck, and with a somewhat dizzy look, sufficiently master of his faculties to inquire for the other oar. Whether the good steel plates that covered his leathern cap had turned the blow, or her own poor attempt had done something towards breaking its force, or that his adversary, hur-

ried and out of breath, had been short of his aim, certain it was Harry had received no further damage than a slice cut from the brim of his headpiece, and an unimportant flesh-wound along the side of the head and cheek-bone, from which, however, the blood flowed freely. It might have added to his lady's relief to have seen the broad grin, hideous as it was in the present state of his countenance, with which he pointed to the old ferryman scrambling up out of the deep water into which he had been plunged head-foremost, on the sudden motion of the boat, before he could let go his hold.

The fugitives were now once more out of all immediate danger, for the shouts and menaces of their pursuers, on the other bank, were only idle terrors, so long as they were masters of the only means of crossing the river for many miles. Making the boat fast to the bank as soon as they had crossed the stream, they only waited until Gladice had hastily bound her follower's wound (not without much opposition on his part), to make their way as fast as possible to Rivelsby. Arrived there, and admitted as a matter of course within its hospitable shelter, they waited in the little chamber near the gate, where wayfarers of the humble rank were entertained and relieved, until Gladice had sent a message to her old friend and confessor, Father Ingulph, to notify her arrival.

Great was that excellent man's astonishment, not so much at the visit itself (for strangers of all ranks and degrees, upon any occasion, and often upon no occasion whatever, were wont to resort to Rivelsby), but at the circumstances under which the lady of Willan's Hope had undertaken it—on foot with a single attendant. Gladice was reluctant, for many reasons, to enter into all the details of her story; but she told the good Father quite sufficient to excite his sincere sympathy and condolence. With somewhat awkward compliments and profuse tenders of assistance, he led her into the guest-hall, while he despatched a lay brother to inform the lord-abbot of her presence, and to take his orders for her entertainment and bestowal in such wise as became her sex and rank.

"I pray you, good Father Ingulph," said Gladice, "look carefully to my poor follower here; he has been sore hurt, I fear, in my service; you have some skill in leechcraft, I well remember."

"A little, dear lady—but a little," said Ingulph, apologetically;—"some poor knowledge of simples. But in the absence of our infirmarer, who hath gone to comfort our bailiff in a quinsey, I will do what I may."

He laid friendly hands at once upon Harry, whose wound had bled through its hasty bandage, and whose stained and bedabbled head and face made him appear more of a sufferer than he really was. The good Benedictine carried him off into the lavatory, in spite of his earnest protestations that he needed no kind of assistance.

"'Tis nothing, good Father, nothing," he persisted; "a little water—or a cup of liquor, if it were not over bold to ask—and I am as good a man as ever."

"Water thou shalt have, and liquor too, as far as may be prudent," said Ingulph; "but thy wound must be looked to—I have promised the Lady Gladice."

In spite of all resistance, the monk insisted upon making surgical examination, and removed the bandage with some difficulty from the matted and blood-stained hair. The blow had gashed the cheek-bone slightly, and passed close to where Harry's ear should have been, had not the knife of the Saxon long since anticipated it. This embarrassing fact it was which made him so reluctant a patient. It was difficult, until the good monk had carefully washed off the blood, to trace the extent of the damage.

"This might well have been an awkward stroke, my son," said he; "it hath taken thine ear clean off."

"Well—it hath left the head sound, reverend father?"

"Praised be St. Mary, it hath indeed! I have a sovereign balm here, made from a *recipe* left us by the blessed St. Grimbald, once prior of our house—used with this reliquary, which contains some of that holy man's hair, its efficacy in the cure of wounds is wonderful."

And he proceeded to apply some of it to the still bleeding surface. It had a grateful coolness, and the man-at-arms submitted to the monk's attentions with a better grace than at first.

The Benedictine examined the head again narrowly, as once more he wiped away the oozing blood, and removed some of the clotted hair.

"A miracle!—a notable miracle!" he cried,

eagerly, as he suddenly paused in his charitable office; "it hath healed under my very hands! The skin is quite sound again! Wonderful is St. Grimbald!"

"The saints know how to reward good service," said the patient, humbly.

"Many a cure I have heard this balm hath wrought," said Ingulph, lifting his hands in admiration, "but none like this!"

"I do, indeed, feel a marvellous relief, Father; and I thank thee and the good saint both; but I shall carry the scars, I fear me, to my dying day; for an ear will scarce grow again. Let them not make ribald jests upon me, good Father, for the loss of it."

Harry was anxiously covering his head again with the bandage, for he had no wish to have the case investigated more closely.

"Stay," said Ingulph, "thou must straight to the abbot—he will gladly take note of St. Grimbald's deed; it is for the honor of our house—"

"Nay, nay, Father; I would not seem to boast of the saint's favor on such an unworthy knave as I am; let it not be blazed abroad overmuch."

"What may be the marvel, brother?" said Andrew the sacrist, who entered at the moment.

"A most notable miracle even now, in my sight!" said Ingulph, relating to him the nature of the wound, and its cure.

The sacrist looked curiously at the recipient of St. Grimbald's favor, who was settling his cap on his head as carefully as he could.

"'Twas indeed a terrible blow," said Brother Andrew; "did it take off both ears at once?"

"It was a two-handed sword, Father, and cut both ways," replied Harry, winking at the sacrist, who he saw was not to be deceived.

The sacrist shook his head and turned off laughing. Good Father Ingulph looked puzzled, but said nothing; and Harry made his escape.

THE method of preparing bread from flour has undergone no essential change since the first discovery of the tendency of paste formed of flour and water to spontaneous decomposition and the consequent formation of a light, spongy mass by the expansion of the gases thereby generated. The only improvement has been the substitution of yeast, in different forms, in place of leaven or spontaneous change.

The preparation of spongy bread by decomposition is, however, accompanied by many disadvantages. These arise chiefly from the extreme difficulty of ensuring the particular form and extent of the decomposition. One form often passes into another during the process of fermentation, by a change in temperature or a variation in the material acted upon; and the dough is incapable of being made into a light, spongy bread, simply by the process of fermentation, except after the addition of alum, or other objectionable ingredients. The medical profession have pronounced fermented bread to be injurious to a large class of individuals of delicate constitution on account of the free acids which it contains, and also from its liability to ferment a second time in the stomach.

Many methods have been proposed and patented for giving the vesicular or spongy structure to soft bread without injuring the constituents of the flour by decomposition.

It appears, however, to have been left for Dr. Danglish to effect so desirable a result; and he has contrived to secure in his process of bread-making the vesicular structure in the most complete manner, purely by mechanical means, leaving the constituency of the flour both unchanged and uncontaminated, the loaf accordingly being absolutely pure bread. The process consists in forcing ready prepared carbonic acid, by means of suitable machinery, into the water with which the dough is to be prepared, and then mixing the flour, water, and salt together, in a highly condensed atmosphere. From the mixing apparatus, the dough is received into the baking-pans, and passed into the ovens, without being touched by the hands; and it is not necessary to touch the bread itself during the whole operation until after the loaves have been delivered from the oven.

The process of manufacture is rather an expensive one, except on a large scale. Messrs. Peak, Frean, and Co., who are working the patent, have determined to put the matter to a severe test. They have established large works at Dockhead, for the manufacture of the bread, and several shops in various parts of the town for its sale. The price for the best is sevenpence per quartern; the seconds, sixpence. We have tried it in several instances, and unhesitatingly affirm it to be the lightest and sweetest bread we have ever tasted. It can be kept moist and fresh for a considerable time, and is known in the trade as the aërated bread

From Bentley's Quarterly Review.

CONNECTION OF THE PHYSICAL SCIENCES.*

ONE of the most singular among the many strange facts in the history of man, is the contrast between the present and all antecedent ages in the manner of interrogating the physical phenomena of the universe, amidst which he has his existence. Stretching backwards over the intermediate centuries of darkness, or fitful and imperfect knowledge, and resting on what were the higher and happier periods of Greek and Roman culture, we still find this marvellous contrast in all that regards the natural sciences. Athens, "the eye of Greece, native to famous wits," was such only in relation to arts, eloquence, poetry, and abstract philosophy. Even the mathematical attainments of the Greeks, save in a limited number of instances, failed in conducting them to those particular discoveries of which this great science is at once the instrument and interpreter. Their logic, even under its most subtle forms, lent them little aid when applied to the phenomena of the natural world. Observation lost its value by the want of method, and by the thousand dreams of popular superstition or false philosophy with which it was blended. Experiment was scarcely recognized as a principle or method of research, necessary though it is now felt to be as the only assured step towards the discovery of truth. Individual exceptions doubtless occur to this remark; and if called upon to name the most striking of these, we should at once refer to the instance of Archimedes as a man who, better than any other of his age, understood the true principle and practice of scientific research. But the general fact remains as we have stated it, and well deserves note as a curious page in the history of the human understanding.

The two works which we have placed at the head of this article are both remarkable in its illustration. We place them together, because, though widely differing in conception, style and method, they have one main object in common, to which we wish to direct the notice of our readers;—that, namely, of expounding the relations of the several physical sciences to one another, and those especial connections, the results of modern discovery, which tend to give coalescence and unity of laws to the whole. The real grandeur of the subject so defined can scarcely be exaggerated. To those not familiar with it, a statement thus simple will convey but a faint and partial impression of all that is implied under the phrase of "Connection of the Physical Sciences;"—of the genius and labor which have been given to this branch of research; of the magnitude of the discoveries thence derived; and of the profound speculations as well as strict inductions which have grown out of the inquiry. In commenting on the works before us, we shall seek to prove this to our readers by examples which may illustrate the bearings of the subject, show something of the vast attainments already made, and suggest the paths still open to future discovery.

We are well justified in applying the term of *profound* to this topic. The process by which particular facts, single and detached in their original observation, are submitted to common laws,—and that still higher grade of induction by which particular laws are brought to coalesce under others more comprehensive,—these efforts and results of human reason become the noblest attestation of the powers committed to man by his Creator, in his relations to the universe around him. The observations of the senses, aided by new instruments of exquisite exactness, and the innumerable new facts thus acquired, form but one element—however essential this element be—in the growth and present grandeur of physical science. The processes of thought itself have been raised into new and higher forms of activity. While induction has been rendered in every case more logical and precise, and the formulæ of number, weight, and measure have been applied to phenomena never before submitted to such manner of scrutiny, there has existed concurrently an extension of inquiry to objects of loftier speculation and theory than were ever dreamt of in any prior age of philosophy. And this, which is true as to each separate branch of modern science, is especially true in what relates to the connection of physical phenomena, through those great natural elements or forces which have common action on all. Here, as will

* 1. *Kosmos. Entwurf einer physischen Weltbeschreitung.* Von Alexander von Humboldt.
2. *Cosmos. A Physical Description of the Universe.* By Alexander von Humboldt. Vols. I., II., III., and IV. Translated under the superintendence of Major-General Sabine, R.A., D.C.L., V.P., and F.R.S., etc. London: 1850-51-52-57.
3. *On the Connection of the Physical Sciences.* By Mary Somerville. Ninth Edition, carefully revised. London: 1858.

presently be seen, we touch everywhere on very abstruse problems, in many of which metaphysical thought mingles itself largely with the more simple conditions of physical research. On these confines human reason is often compelled to stop short or recede. Nevertheless the boundary is nowhere so rigidly defined as to prohibit the effort to press beyond; and physical science abounds in instances where a seemingly impassible barrier has been broken through by happy accident or a fresh impulse of genius, and new and still more fertile fields have been laid open to research.

Before enlarging, however, on these topics, we must revert briefly to the two works before us. We might have cited many others, which, though less explicitly, do yet, in one point or other, embrace these mutual relations of the sciences; invited, or even compelled, to this by the importance such relations have assumed in every part of physical philosophy. No branch of science can now be treated of singly, or without clearly denoting the connections which are every day becoming known to us as closer and more stringent. We still give the name of Naturalist to one who collects his specimens or facts within some single area of physical inquiry; and such men are, in truth, eminently useful in the work they perform. But no one can now be named a Natural Philosopher who does not look beyond the science he especially professes, and trace its kindred and connections with others. Lines converge, circles coalesce, partitions disappear, and there is no portion of such knowledge left alone and apart in the great arena of physical research.

A few months only have elapsed since the life of Humboldt came to a close. It would be superfluous to dwell here upon the name and reputation of this remarkable man, rendered familar to us by seventy years of energetic labor as a traveller, a naturalist, a philosopher, and a writer. His high eminence in each and all of these capacities is attested by the concurrent opinions of his scientific contemporaries, of the two generations through which he held his untired career. A large share of poetic temperament, blended with his graver faculties, tended much to give light and lustre to the labors of this long life. He gazed on the face of nature over the globe, with senses awake to the beauty and grandeur of creation, as well as to those great physical problems, whether of organic or inorganic existence, which claim the strict science for their scrutiny. He had a singular faculty, surpassing in this respect every other naturalist and writer of his age, of bringing together those great relations and analogies in the natural history of the globe, which raise geography into a science; while by a full command and bold use of the copious language of his country, he greatly enriched the vocabulary by which such relations are described. This rare combination of qualities, aided by a genial temper and freedom from certain cares which perplex the lives of so many men both in literature and science, doubtless contributed to the maintenance, in his ninetieth year, of the faculties which illustrated the earlier part of Baron Humboldt's career. Some few philosophers—or those so called—of ancient as well as modern time, have reached the same age. But no one has compassed such a work as the "Cosmos" under this weight of years; or shown the same faculty of keeping pace with all the various knowledge of his time, and with the almost new creation of some branches of science, which in their vigorous growth have already reached those of earlier date.

Yet this work, however remarkable, has certain blemishes both of design and execution; and these, it may be added, strikingly illustrative of the intellectual qualities of its author. The conception expressed under the title of the "Cosmos" (one drawn from the most ancient schools of philosophy, and admirably denoted by Aristotle), though repeatedly defined in the introduction, as well as elsewhere in the work, seems never thoroughly to have satisfied his own mind, and we believe has very partially been conveyed to that of his readers. In his preface, Humboldt alludes to the half century during which the image of such a work had been floating in undefined outlines (*in unbestimmten Umrissen*) before his imagination. This ill-defined character of the design pervades, we are obliged to say, every part of its execution. The scheme itself was too vast for completeness, and for that proportion of parts which such a scheme requires. Here, indeed, Humboldt was in some sort a martyr to his own multitudinous knowledge. The memories of a long life of travel and study, and of personal intercourse with every scientific man of his age, crowded upon him so exuberantly, that

the order and method needful to so vast a theme was often lost to his view. On certain topics, such as Physical Geography and Natural History at large, he dwells with a fondness which shows the strong hold they ever had on his mind; and his successful labors in these great fields gave him full right to this almost parental predilection. But it is exercised at the expense of that due adjustment of parts which is essential to the professed plan of the work.

These remarks especially apply to the later volumes of the "Cosmos," and they point to another default, inevitable indeed from the very nature of the plan, but infringing much on its unity and completeness. Such a work could not be compassed at once, or in any very brief time. Twelve years have elapsed since the first volume was published: death came upon the illustrious laborer before he had ended his task. Meanwhile science, in its every part, was undergoing rapid and marvellous changes; not merely by onward movement, and the discovery of new physical laws, but also by the reflex influence of those laws, and the facts which served to their discovery, upon all sciences of an earlier date. Chemistry may be taken as a notable instance in point. Here, some thirty or forty years have sufficed so completely to overset all former facts, nomenclature, and theory, that the best chemist of that prior time would be utterly lost in the most elementary book of the present day. Electrical science, taking the term in its widest application, has undergone similar and equal changes. Without adducing other instances, little less striking, we may remark generally that a work published by distant instalments, as the "Cosmos" has been, must needs fall in arrear of the actual state of knowledge at each of its stages; a default only to be remedied by such repetitions or corrections as tend in many ways to impair its value.

We feel pride, as well as pleasure, in associating with the illustrious naturalist of whom we have just spoken, the name of our own eminent countrywoman, Mrs. Somerville, whose volume, in its ninth edition, now lies before us. The circulation, so denoted, of this work, does credit to the scientific spirit of the age. Mrs. Somerville is not what may be termed a popular or elementary writer; but she has qualities and powers which entitle her to a higher place as a scientific teacher; and render her volume on the "Connection of the Physical Sciences" one of interest and value even to those who hold the first rank in modern science. That command of the higher mathematics which made her a worthy expounder of the "Mécanique Celeste" of Laplace, is shown here by a concise exactness of method in treatment of her subject, which might pass for austere, were it not redeemed by the simple, unaffected style which pervades every part of the work; too compressed certainly for the careless reader, but clear enough to all who have their attention duly awake. Mrs. Somerville, we must add, is capable also of very eloquent writing; and it is an eloquence always seen to come from her own strong feeling of the grandeur or beauty of the objects before her. But she never uses it superfluously or lengthily, or with other intent than that of engaging the mind of her reader in the same train of thought and feeling with herself.

The comparison of this work with that of M. Humboldt offers certain contrasts, curiously expressing the intellectual differences which produce them; the more curiously, because these differences are not such as might be looked for from the respective sex of the writers. The natural genius of Humboldt was not mathematical; that of Mrs. Somerville is eminently so. The effect of this diversity is seen in every page of their respective writings. The former expands all he touches upon; and if, as we have seen, the topic be one endeared to him by the memories of past life, he seems hardly able to quit its precincts. Mrs. Somerville always holds the subject in her hands; methodizes her facts in due proportion, without omitting any; and compresses more solid matter into a small compass than any other writer whom we know. Her preface and introduction are striking instances in point. The whole volume, indeed, in this respect, is a model worthy of study; but fit for imitation only by those who can equally well with her realize Quintilian's definition of brevity, "Non ut minus, sed ne plus dicatur quam oporteat."

We must further add, in comparison of these two works, that Mrs. Somerville has better defined to herself the purport and plan of her undertaking than we have seen to be the case with the "Cosmos," and has thereby given greater facility to the comprehension of the reader. Under a less assum-

ing title, she virtually includes all the great physical phenomena of the universe, and that mutual connection amongst them, the knowledge of which is the highest end and aim of physical philosophy. It is this connection which chiefly gives its value to a scheme like that of the "Cosmos," and blends its parts into any thing like a whole. We feel, in going through Humboldt's volumes, that he has not kept such conception sufficiently before him. Mrs. Somerville has better done so; but even her power of compression can hardly condense into a single volume relations now made known to us as pervading every part of science. The copious notes at the end of the work furnish (as they do still more in the "Cosmos") much valuable illustration. But in these busy days of rapid and desultory reading, such notes are buried to all but those who least need to refer to them.

In truth, this subject of the connection of the sciences has become so vast and various in its details, that we cannot hope to give more than a general view of what is comprised under the term. This may best be done by the selection of particular examples, indicating the nature and methods of the inquiry, and some of the more striking results already attained. In taking them from different and seemingly remote departments of science, we shall show how closely all these really approach, or even lock into each other, by their relation to certain common forces, the great elements of power and action in the material world. Any difficulty in giving such examples arises, indeed, from this interblending, and from the reduction, under common laws, of phenomena seemingly the widest apart in origin and nature; a fact which will make needful at some future time, when our knowledge is more fully matured, the recasting of the whole scheme and division of the physical sciences, and even of much of the nomenclature now applied to them. Such reformation must be founded chiefly on the inductions obtained from the observed actions of forces on, and within, the various matter of the universe. The better understanding of this great primary relation has much contributed to the high attainments of modern discovery; suggesting and guiding experiment, and giving a sounder basis to all conclusions thence derived. Entering thus integrally into our subject, we must speak of it at some length, as preliminary to what follows of further illustration.

We may begin by repeating the fact, that all we know, through our senses or reason, of the physical world, are the various conditions and changes of matter, produced by the agency of forces, of which we are cognizant solely through this action. Narrow though the definition may seem, it nevertheless expresses what forms the foundation and fabric of all physical science. The most vast and remote, as well as the nearest and most minute operations of nature, come within its scope, and may all be resolved into the relation of matter and force thus simply described. The definition extends to animate as well as inanimate existence on our own globe; though stopping short of that more wonderful power of mental intelligence, which also has present dependence on material organs, and the forces acting upon them; but has other relations besides, which human reason is utterly unable to interpret to human curiosity. Nor can this cursory definition of the true nature and objects of physical knowledge be deemed a barren one in use, seeing that it explicitly declares that first and fundamental connection in science—the great relation between matter and force; itself pervading all nature, and the source and centre of all subordinate relations. This is the master-key which unlocks the many chambers of the natural world, setting before our sight the order, symmetry, and beauty of the whole.

It is worth while to notice here how clearly the distinction between matter, and the powers acting upon it, as the foundation of natural knowledge, was adopted by the most eminent of the ancient philosophers. The notion of intelligence, indeed, was often blended by them with the active causality of power, as separate from matter. But even now, how difficult is it to draw lines which may strictly define the parts of this great problem, and distinguish what belongs to general laws from the unceasing intervention of that supreme power which created and upholds them! The instinctive actions of animal life put this question into its most definite shape, but provide human reason with no answer to it.

It would be needless to the argument before us to proffer any of the many phrases or conceptions, metaphysical and material, by which it has been sought to define this word of "matter" more clearly to the understand-

ing. We may well express doubt whether any of these attempts have succeeded. In relation to our senses, and the perceptions of what is external to ourselves, the simple name is as distinct, and says as much, as the most labored definition. The conception of matter, thus derived, is an integral part of our own existence, and cannot be aided by any artifice of language or refinement of thought. The problems regarding it with which we are now concerned, are not those as to its intrinsic nature and origin, which perplexed the minds of ancient philosophers, and have not been disentangled by the better logic of our own time;—but those which regard its various forms and changes, as determined by the natural forces ever present in action upon it. In saying that matter is the subject of number, weight, and measure, as essential and peculiar conditions of its existence, we embody and affirm a definition, which has more practical value than any other; since it is through these functions mainly that we find access to it as the subject of experimental and inductive inquiry.

The question regarding the nature and origin of the physical forces—viz., those which act upon matter—requires to be dealt with more largely. It is, in truth, one of the most abstruse as well as interesting problems in all science. Vaguely speculated upon in certain points by thoughtful men of every age, it has in our own time, and especially within the last few years, become an object of the most exact and zealous research; to which refinements of experiment, unknown heretofore, having been applied, and with results surpassing the most sanguine expectation. The recent history of science, in its relations to light, heat, electricity, magnetism, and chemical action, affords ample proof to this effect. We name these particular branches of science, because they include some of the most universal and active elements of force and power in the natural world. We do not mention the force of gravitation here for reasons to which we shall presently allude. Nor in regard to those we have named, can we affirm that each is in itself an individual power, distinct in nature and origin from the rest. Research is at the present time actively employed on this question; and, more partially and tentatively, on a question of still greater obscurity; viz., whether there be not other powers, unknown or less clearly recognized, which are especially concerned in giving to matter the endowments of organization and life. Science has reached the threshold of this mysterious inquiry, but not yet penetrated within.

It must be fully admitted, indeed, that we know these powers, not separately in themselves, but solely through the changes which take place in matter subjected to them. We use the term force simply from the need of having some word to express this action, and not from any more abstruse understanding of the intrinsic nature of the power so denoted. We speak of "centres of force" and "lines of force," under the same necessity of language to express observed phenomena. We may seek to vary and simplify our conception of forces and dynamic action by regarding them as intrinsic conditions of matter itself under its various forms; but we gain nothing by this assumption save a new phraseology. It is as easy to conceive powers, extraneous to matter, moving and modifying it, as to conceive such powers inherent in matter itself. So, again, if we take the word "*motions*" as expressing all we really know of the phenomena, it is but a barren simplicity we attain, profitless for any better understanding of their real nature. The main question still recurs, Is matter acted upon by powers different from and extraneous to itself? Fully admitting all its difficulties (and especially those which belong to what have been deemed the latent conditions of force), we think this question may, provisionally at least, be best answered in the affirmative. We believe that the term "*forces*," without other limitation, is well calculated to denote these powers; and that such general conception is best fitted to give objects and guidance to future research.

On the other hand, those who consult impressions of the senses only, may allege that electricity, light, and heat, have physical properties in themselves, independently of the matter they pervade in their action. The sunbeam, traversing in determinate time what appears to be the void of space, may well suggest an entity in itself; and equally so the electric spark, or the more intense light produced between the charcoal polar terminals of a voltaic circuit. We can hardly describe these phenomena without recurring to material terms; and it is not easy to guard the understanding against impressions thus created. Yet a closer scrutiny will make it

probable, if not certain, that in every case, yet known to us, matter is actually present and necessary to the manifestation of these powers. The influence, whatever it be, evolving light (and the great poet of light has well asked who can "tell its fountain"), comes to us through space; but a space, as we have cause to believe, not devoid of matter, however we may denominate this subtle medium between distant worlds. The light so reaching us, as well as the heat which comes almost as an integral part of the same power, are known to our senses only when impinging upon or traversing the various forms of matter around us. In that wonderful analysis which the prism affords of the ray passing through it, the separation takes place in a material texture, and the separate parts and proportions of the spectrum—luminous, calorific, and chemical—become known to us through the intervention of other matter, including that of which the recipient organ of sense is itself composed. The same reasoning applies to the wonderful phenomena of light in its relation to different crystalline forms; of which it becomes the almost mathematical exponent, from the modification it undergoes in transmission through them. In electricity, again, we cannot name a single phenomenon where this power is manifested apart from the presence of matter;—a fact strikingly verified in some recent experiments of M. Gassiot; where, by chemical means, a vacuum was obtained, so perfect in degree, that a powerful current of electric force was utterly arrested from the want of the medium necessary to its conduction.

We have, then, before us these two foundations of all physical science—Matter, inert, for aught we can affirm to the contrary, except when acted upon by forces extraneous to itself;—Forces, unpossessed, as far as we can discern, of any of those properties which we deem truly material, and manifest to us only through their action on matter;—both so blended in action that it is difficult to dissever them by language, or to regard them otherwise than as existing in mutual and necessary relation;—both subject, we have reason to believe, to one common law of conservation or permanence; that is, that neither matter nor force are lost or lessened in amount by any of the changes they mutually undergo. Their dynamical relations and effects, and the phenomena they offer to the senses, are varying at every moment of time. Force may be latent or hidden within matter—a simple expression of a most mysterious fact—and extricated again in equivalent amount after indeterminate lapse of time. But in no case whatever can we truly create either matter or force; in no case do we, or can we, diminish or destroy them. Thus far we may venture to generalize, and to give language to the result. If seeking to go further, and to find some more explicit definition, we reap little more than a crop of empty phrases. The pithy saying of old Bishop Andrewes, "Waste words addle questions," is nowhere more true than in regard to these questions which lie on the very confines of the physical world.

But while unable at present to generalize further on this subject, we may follow in an opposite direction what, in fact, is the wonted course of physical science, by adverting to the particular forms and modes in which matter and force come before us in this great world of nature, which they thus fill and animate by their presence. The subject, so stated, is in itself wellnigh inexhaustible. We can only touch upon it so far as is needful to the object immediately before us.

Of matter, as at present known on our globe, there are upwards of sixty elementary forms, designated as such because hitherto unresolved by man. That all these are truly simple and separate bodies, few chemists (to whom chiefly this question belongs) would be found to affirm. Metallic bodies, so described from certain common qualities, form two-thirds of the whole, and a still larger proportion of the solid crust of the globe. The researches of late years, while augmenting the number of bodies seemingly simple, give cause for believing that these may hereafter be reduced by the discovery of certain bases or simpler elements, common to many of them. This is yet speculation only; but speculation, emboldened by results actually attained; showing how much that has been hidden from the eye of man in every prior age, can be brought into light by the genius and subtlety of modern experiment. What more striking transformation than that of the dull earths—clay, flint, lime, and magnesia—into brilliant and highly inflammable metals, simply by the removal of the oxygen they contain? and this oxygen removed by the action of another metal, sodium; lighter than water, and burning in contact with it; yet, as

the basis of sea-salt, filling with metallic matter the great oceans which encompass the globe! Chemistry, again, furnishes various relations of bodies—such as those of the three remarkable elements, chlorine, iodine, and bromine—so close and intimate that we must needs regard them either as having some common principle yet hidden from us, or as connected and convertible series—a phrase sanctioned in provisional use by some of the most wonderful phenomena which this science has disclosed. In the same light we may regard the facts lately discovered as to the allotropic conditions of certain simple bodies—of which oxygen, phosphorus, and sulphur, are notable examples—where the component molecules, chemically unchanged, as far as we can see, undergo remarkable changes in their physical properties and relations. The latest experiments of Schönbein on ozone and antozone, and certain analogous facts regarding the compound bodies of cyanogen and paracyanogen, show that this is but a step in progress towards some more general law.

Here, indeed, chemistry, while every day assuming closer connection with the other sciences, retains a glory appropriate to itself. In denoting, by its peculiar methods of research, and by formulæ almost mathematical in kind, those transferences, substitutions, and definite proportions in the ultimate parts or molecules of bodies, upon which all material phenomena depend, it has carried us more deeply than any other science into the mysteries of the material world. And to these methods further pursued, we may look with much confidence for the result of which we have just spoken; viz., a more exact knowledge of what are really simple or elementary bodies in the material world. In reaching or even approaching this truth, we should attain one of the highest objects of physical research; and in the progress and very act of such attainment, find interpretation of some of the most mysterious problems which physical science has put before us.

We have now to speak, in the same summary way, of those forms and modes of force, which, in their action on matter, are made known to us as the efficient causes of all motion and change in the universe. We have already disclaimed any abstract understanding of the word "force," as separate from these effects. A metaphysical sense given to the term, expressing either a direct relation to the supreme Creator of all, or to some secondary and subordinate power, undefined to our reason, cannot expediently be admitted into any physical discussion. Even with this exclusion, indeed, the subject is full of difficulties and questions yet unsolved; but they are questions which come within the fair scope of inquiry, and are better defined at each stage of our progress in research.

What, then, are these several forces which thus act upon matter; and how to be distinguished in their nature and manner of action? We cannot any longer limit our reply to a bare enumeration, suggested by popular language, or even by the wonted phraseology of scientific works. We may speak of the forces of gravitation and cohesion, of electricity and magnetism, of light and heat, of chemical affinity, and of nervous power; and, in so doing, we recognize distinctions necessary, it may be admitted, to the description of these several forms of natural phenomena. But all the terms thus used, need, more or less, fresh definition to satisfy the demands of modern science; and need, above all, that we should show the individuality of the forces they severally describe. This latter condition contains in itself the pith of the whole question. Are these great powers severally distinct in themselves, or are they so connected as to be translatable or mutually convertible in their actions on matter; warranting thereby the conception of a nearer approach to unity of origin and nature, than any former philosophy has ventured to assert? The question has been taken up with ardor and success by the philosophers of our own time; and we owe Mr. Grove, first and especially, the recognition of a law of mutual convertibility, applying definitely to certain of these powers, under the title of the "Correlation of Physical Forces;" a phrase not exceeding the limits of actual discovery, and well fitted to give basis and suggestion to further research. Such connection or correlation will indeed be at once discerned as one of the highest objects of physical inquiry. It enlarges and simplifies all that comes before our reason as the proximate cause of motion and change in the universe; and especially corroborates the great law (if we may venture so to describe it) which assigns definite and invariable pro-

portion to every such action or change in which matter and force are mutually concerned.

We have spoken of certain of the forces only, named above, as being submitted to this law of mutual conversion, since even the great power of gravitation must, as far as we can yet see, be made an exception. Acting universally on matter, whether remote or proximate in space—whether massed, as are the great globes of heaven, or divided into atoms of inconceivable minuteness—this power is known to us under conditions which seemingly detach it from any other in the universe. Like other forces, indeed, it is only recognized in active connection with matter; but this action is ever of the simplest kind, and in no case that we know convertible into any new form. Visible to us in the mutual attraction of bodies, it involves seemingly no other property or condition; unlike in this those other forces, electrical, magnetic, and chemical, the dual or polar quality of which is present in every instance of their action, and shown in such variety of wonderful phenomena. Future time will tell whether human reason is able to penetrate further into these obscure passages of nature; and to bring the force of gravitation into more direct connection with the other powers which pervade and govern the material world.

From the future also we must seek a solution, if ever attainable, of the question as to another force; hardly indeed to be described under a single name, seeing how many and wonderful are its attributions, and in what manner it is linked with functions of a higher order than any we can assign to matter alone. We speak here of that which has been variously called nervous power, nerve force, vital principle, etc.—terms expressing a power acting like others on and through matter, but belonging to vital organization only; and indeed (if we may invest in words conceptions thus obscure) the instrumental agent itself, by which matter is moulded into the many forms of life. This agent, whatever it be, has close and unceasing connection with what we may call, in relation to it, the *outer forces* of nature, electricity, heat, light, and chemical power. We see their mutual dependence at every moment of time; testified in some cases by excitement and increase of action; in others by check and contravention; in no case, as far as yet proved, by actual conversion or interchange of these external and internal powers. Whether in regard to the vital force, under this limited definition, there is really a plurality of powers concerned in functions thus various and seemingly incompatible with any one single agent—and, if it be so, how such plurality may be conceived and defined—are questions we cannot stop here to discuss. We must admit the general fact, that experiment has not yet resolved, nor language been able to define, the true elements of vital power. Vague phrases (*ρηματίσκια αἰνιγματώδη*) have been brought forward to cover this want of understanding, but oftener with the effect of obscuring than revealing the truth sought for.

In separating, as we have just done, gravitation and the vital power from the other natural forces, we simplify the topic in some part without removing its real obscurity. These other forces are the subject of more various experimental research; but the phenomena thus obtained belong to the matter they act upon, and do not disclose the intimate nature of the agents themselves. These phenomena, however, as we have before said, are the true materials of physical science; and though they do not disclose what we may call the secret entity of force, they inform us of the relations of its different forms, of their several modes of development, and the changes they undergo in action or seeming repose. A striking example of the knowledge thus gained, is the proof we now possess of the identity of the electrical and magnetic powers; succeeding to the proofs before obtained of the unity of the machine and voltaic electricity; and anticipating, we would fain hope, some more exact knowledge of that which causes and constitutes the polar and dual nature of this great force. This is one of the great problems which science is yet required to solve. If such knowledge be ever attained, it will give us a deeper insight than any other into the mysteries of the world we inhabit; seeing how universally this power penetrates and pervades all created existences, animate and inanimate, and its inseparable connection with the other forces of heat, light, and chemical action ever in operation around us.

We have already alluded to those phenomena of seeming convertibility, *inter se*, which so strikingly express the close connection of these forces, and even carry the conception forwards to something like absolute unity,

modified only in aspect by the conditions of the matter subjected to them. Science is now halting at the threshold of this theory, unable yet to scale its steps. But in approaching it, facts have been laid hold of—equally certain as curious—which almost compel the attempt to go further. When we find that we can by chemical action generate an electrical force, which, conveyed (in what we call a current) through different combinations of matter, may be made to evolve heat, light, magnetism, dynamical action, and chemical effects—all these actions successive and distinct, but all embodied, as it were, in the same single current, and in constant and even mensurable ratio to one another—we see at once a new horizon of discovery opened out before us, and relations disclosed of a higher class than any presented by the insulated phenomena of prior research. These relations of mutual convertibility science is now seeking to substantiate, and to render their interpretation more precise. They furnish foundation for, and best illustrate that great theory, now brought prominently into view, that force may be totally altered in its aspects and modes of action, or often rendered latent to all human observation, but can never be annulled or even lessened in its total amount on the globe —or perhaps we might say, in the universe of worlds. If this be finally sanctioned to our reason, it becomes in effect the grandest of all natural laws; giving unity, universality, and indestructibility to this element of power or force which is working around us, and within us, at every moment of time, and under every form of existing things. Without presuming to define it further, we may at least venture to regard this as the nearest approach we can make, through the phenomena of the physical world, to the great Creator and fountain of all.

We have dwelt at length on this subject of matter and force, but hardly beyond what is warranted by its high interest, and the place it now holds in all physical inquiry. It will be seen, moreover, that it gives especial foundation to those views regarding the connection of the physical sciences, which it is our object to illustrate. These very elements in themselves, and in their mutual relations, furnish the true index to the inquiry. They connect together phenomena seemingly the most remote, and expound anomalies which else would vainly perplex our reason. The examples we are about to offer, representing scantily indeed all that might be given, will suffice to place this fact in a clear light. We advert to it the more pointedly, because neither in the "Cosmos," nor in Mrs. Somerville's volume, do we find this bond of connection so explicitly kept before the mind of the reader as it requires to be for the due understanding of the subject. We need some guidance like this through the vast aggregation of physical knowledge already attained, which else is little better than a labyrinth to our reason. We need it also for adventure on "that great ocean of undiscovered truth," profound as well as wide, which still lies before us.

In taking astronomy as our first example, we are led rather by the arrangement of the two works before us, than by any familiar illustration this science affords of the connections we are seeking to denote. Though less obvious, however, and less perfectly known, the relations of astronomy to the other subjects of physical science have high interest in the speculations to which they legitimately conduct us. Three at least of the elementary forces of which we have spoken, gravitation, light, and heat, are directly mediate in action between the earth and the great central body of our system. Two of them, gravitation and light, extend, as we know, far beyond this limit of sun and planets; reaching to those remote worlds and regions of space, of which the eye of the telescope alone informs us. The revolutions among the multiple stars, in accordance with the great law of gravitation, give proof as to the former. The very existence of these distant worlds, whether single or seen as nebulous clusters, is made known to us by the light flowing from them. But though positive proof may stop here, modern science affords strong presumption that the electrical or magnetic force forms another link, however little we can yet define it, between our earth and the other great globes belonging to the solar system. The sun and moon, from their magnitude and proximity respectively, have chiefly furnished this evidence. It has been rendered next to certain, by long series of observations on the magnetic needle in different places, that many at least of its periodical variations depend on influences extraneous to the earth itself. As such we may probably regard those strange and sudden disturbances, named by Humboldt *magnetic storms*, which affect the needle *simultaneously*

at places thousands of miles apart from each other. The beautiful experiments of Faraday, on the effects of heat in lessening or destroying the magnetic quality of oxygen, go far to sanction the belief that the daily and annual variations in the dip and declination of the magnetic needle, as observed here, may be due to the coincident fluctuations of the solar heat acting on the oxygen of the atmosphere, and thereby affecting periodically the lines of magnetic force which are ever in movement around the globe. But we have other researches also, which indicate more directly a distinct magnetic state of the earth, in relation to the sun and moon at least, among the heavenly bodies. Observations at Milan and Prague, reduced by M. Kreil, and confirmed by the averages of five years' hourly observations at Toronto, St. Helena, and Hobartown, show a variation in the magnetic declination, depending on the moon's position, and completed in a lunar day; while we owe to the exact and laborious researches of Sabine the still more curious discovery of a periodical relation, of about eleven years, between the maxima and minima of diurnal magnetic declination, and the maxima and minima of solar spots, as registered by Schwabe, from observations of more than thirty years. Facts like these, and connections thus indicated between distant worlds, by the delicate motions of a slender needle on the earth, may well rouse speculation in the dullest thought. The philosopher looks to such relations as his best guidance to ulterior and higher discovery; and in the electric force, under its various forms, discerns an agent of mightiest power in the universe, and closest in kindred with all other powers.

The relations between optical and astronomical science are of deep interest throughout. Astronomy, indeed, may peculiarly be called the science of light, since this element is the first and sole evidence to us of the existence of worlds without; and the interpreter of those wonderful phenomena of number, time, and space, the submission of which to human knowledge may well be deemed the highest attainment of man. The motions, long observed, of a single small spot of reddish light in the heavens, led to the discovery of the three great laws, rendering Kepler's name second to that of Newton alone in astronomical history. The vast motion of the sun and the whole solar system in space, is made known to us solely by observation of the proper motion of certain luminous points in the sky which overhangs us. One admirable application of the science of light and of optical instruments enabled Sir W. Herschel to penetrate into the depths of space, and to establish relations of distance which no conception can follow, though figures may seek to denote them. This remarkable man may almost be said to have created the method of research here denoted. The first to adventure upon it, he advanced so boldly and so far, that his results were received with incredulity at the time, and their truth and value attested only by later investigation.

But the connection of optical science with astronomy is not limited to the results obtained through the eye and the telescope, vast and astonishing though these are. The subtlety of modern research has directed itself to the examination of solar light, not solely in its properties when impinging on the earth, but even in its relations to the great globe of the sun itself; deriving thence certain analogies, which strikingly illustrate the connection of physical laws throughout the universe. We cannot positively prove that the ray or wave of light, as issuing from the sun, possesses all the complex and marvellous properties which are evolved in its passage through the prism, to which we subject it here. But from these properties, as observed on the earth, we can draw certain conclusions, more or less assured, as to what is happening nearer the fountains of this great elemental power. The discovery of the polarization of light, for example, has corroborated Sir W. Herschel's opinion, that light issues not from the body of the sun, but from a luminous envelope or atmosphere around it; the argument resting on the fact, that rays issuing from within a mass, and traversing its surface obliquely, become polarized, which the sun's light is not. Again, availing himself of the common law of refraction, the astronomer is able to show, by placing a prism before the object-glass of his telescope, that the light from the fixed stars is submitted to the same refraction, evolves the same colors, and possesses the same velocity as that of the sun; thus more explicitly denoting the sun itself as a simple star in the vast sidereal system. Even the new science of photography furnishes examples of the relations we are now indicating. The experiments of Bunsen,

Roscoe, and Draper, show qualitative as well as quantitative differences in the chemical effects thus produced; some of which we may presume belong to the terrestrial media through which the rays pass; while others can hardly be explained but by supposing differences in the solar light at its very source, and having relation to the substance, configuration, or other conditions of the sun itself. The singular changes, periodical or otherwise, ever observable on the surface of this great globe, warrant the belief in such fluctuations of its light, though they may not yet tell us any thing beyond this.

We might easily, had we space for it, multiply examples to the same effect, and carry them further to that other form of elemental force, the solar heat; if, indeed, we can define this as distinct from the light, with which it is so closely blended in passing through space. Endless questions press upon us here, and discovery resolves one only to bring others into view. We have obtained innumerable facts regarding heat in its various forms, and yet are ignorant of its intimate nature, as distinct from the matter it acts upon. Scarcely can we venture a theory for the radiation and focal concentration of cold—the negation of heat as we are taught to regard it—or adopt with any clear understanding that formula for the "temperature of space," with which the ingenious researches of Fourier and Svanberg have furnished us. We are, in fact, brought again here to the abstract question of forces, as agents in the material world; and to that principle of mutual convertibility to which we have already alluded:—the circle of science thus ever tending to contract itself around certain central and common laws, which, though never perhaps to be reached, must always be kept in view as the ultimate object of research. The phenomena of light and heat stand peculiarly in this close connection, both in their origin and in all their secondary aspects. We may seemingly separate the elements thus named, by the intervention of certain kinds of matter, as in the familiar example of the glass screen, or in Melloni's more delicate and complex experiments. But such separation really tells us little more than does the disseverment of light into different colors by refraction through a prism; while all recent inquiries, especially those of Forbes and Melloni, have shown us that radiant heat, in common with light, is strictly subject to those great physical laws which are recognized as the basis of the undulatory theory;—the correlation being such that heat has not only been polarized and depolarized, according to the terms of this theory, but the phenomena of circular and elliptic polarization have still further confirmed and defined the analogy in question. It remains for the future to show whether the speculations of Ampère, Cauchy, or others of later date, in regard to the connection of heat and light, and of both with matter itself, can any of them be verified, or brought under the conditions of a physical law. Not merely well-devised experiment, but much of cautious induction is needed for any such result.

It will be seen, in all these remarks, how continually the connection of the several sciences comes before us, as a result of present researches and a foundation for future inquiry. Before bringing examples from our own globe, we must still briefly advert to a question—one of the highest problems in physics—as to the manner of conduction of forces through the vast regions of space intervening between distant worlds. Can they be conceived as transmitted from one globe to another through an utter void?—or is intermediate matter, whatever its tenuity, necessary to their transmission? Can they in any case be conceived as transmitted instantaneously, or is time in every case essential to their propagation in space? These questions concern all the forces coming to us from without; though, for obvious reasons, often applied to gravitation only. The first is met, if not answered, by saying that we have no proof of any absolute vacuum in nature;—that whatever evidence we have is against it, while attesting the infinite tenuity which matter may actually assume;—and that many of our greatest philosophers, Newton foremost among them, have asserted the existence of such medium, whatever name we choose to give it, as needful to explain the action of forces in space. As already remarked, we know force only through matter; and we cannot conceive, or reason upon it, apart from this conjunction.

The question as to *time* must be answered differently for gravitation and other forces. Of the rate of transmission of light and heat, as coming from the sun, we have got a measure; far surpassing, indeed, any clear conception of conducted motion, yet certain and

definite in amount. It may be that future research will give us a similar measure of the electric or magnetic force emanating from the sun or other globes in space; but hitherto we have none except such as is derived from observing its rate of transmission through material media on earth; experiments showing a velocity equal to, or exceeding possibly, under similar circumstances, that of light; but varying greatly, as we have reason to believe, according to the nature of the conducting medium. Of the force of gravitation we have hitherto no measure whatsoever, nor is it easy to see whence it can be obtained. If time is to be admitted at all as an element here, it is under conditions which can hardly be defined or conceived; since, from considerations connected with the secular acceleration of the moon's motion, Laplace estimates that the rate of transmission cannot be less than seven million times swifter than that of light, and may be much more than this. So incomprehensible to us are such relations of force to time and space, that we are at once driven to the term *instantaneous* as the only mode of expressing them,—a phrase in itself betokening the impotence of all human reason on the subject.

In speaking thus far of the connection which science has denoted between our own and other worlds, we have alluded only to what we must designate as the forces concerned in this relation. Our knowledge has yet only partially and doubtfully reached to the conditions of matter more or less distant in space, from which these forces emanate, or through which they act. We have just spoken of some of the physical reasons for supposing a material elastic medium as necessary to these phenomena of relation; but such medium we cannot examine, nor define otherwise than in its extreme tenuity. We can bring various presumptions, both from probable common origin, and from actual phenomena, that the matter composing the other bodies of our system is analogous to, if not identical with, that of the earth; but here, again, all absolute proof is wanting. The nearest approach to it is the curious evidence furnished by the aerolites or meteoric stones, which fall so numerously upon our globe, but are clearly alien to it;—coming, as Laplace describes them, "*des profondeurs de l'espace céleste;*" and from their general community of character (whatever the date of fall or orbital place of the earth at the time) probably representing elementary matter largely diffused in space; or, it may be, forming the common material of the planetary system. Here chemistry and mineralogy come into direct connection with the inquiry. They have disclosed some nineteen or twenty ingredients of these meteoric stones;—all, be it observed, well known to us here, though under different forms of combination, and (what is also worthy of note) iron greatly predominating over the rest. Analyses cannot be too extensively multiplied of these remarkable bodies. Such examination may possibly bring to our knowledge new forms of matter; or make it probable that some of those metallic substances, hitherto found only in rare specimens on the earth, do really exist more largely in the fabric and material of other worlds.

Coming now to the illustration of our subject—the connection of the physical sciences—from terrestrial phenomena more properly thus called, we find examples so crowding upon us, that the only difficulty is of selection out of their number. Physical geography occurs most naturally in sequel to the topic we have just quitted; a science created almost within our own time, or rather an aggregate of sciences, so various and intimate are its relations with every other branch of physical knowledge. To Humboldt himself we owe its first clear definition; while to his labors and genius we are indebted for its rapid progress, and for the happiest illustration of its objects and methods of pursuit. But in regard to this subject we owe great obligations to Mrs. Somerville also, whose two volumes on physical geography are the best that have yet come into our hands.

We have spoken of this as an *aggregate of sciences*, and may briefly justify the phrase. Its connection with astronomy is closely established through the various effects due to gravitation and the motions of the earth itself in space, the tides, winds, currents of ocean, etc.;—through the influence of solar light and heat, constant or periodical, in the surface of our globe;—and through the electrical or magnetic relations, certain in action, but hitherto more vaguely understood. The connection of physical geopraphy with geology is yet more intimate;—seen in all that relates to the external configuration of the earth; the order, elevation, and depression of the

strata forming its outer crust; the distribution of land and sea; the site and direction of mountain chains, and of their mineral and metalliferous contents; the phenomena of earthquakes and volcanos, and the slower changes of level silently going on in other regions; the evidence of a central heat, residual on the original consolidation of the globe, and the probable agent in these later changes of its surface; and the fluctuations of atmospheric weight, heat, moisture, and electricity, ever occurring in effect of the relation between the atmosphere and the solid surfaces underneath. These latter phenomena more especially bring before us the further connection with chemistry; that great science which, by deciphering the affinities and mutual actions of the ultimate molecules of matter, becomes, in effect, and including the element of time, the exponent of the mightiest changes we witness on the surface of the earth;—those workings of disintegration and renewal, of separation and combination of the material elements, which are ever going on around us; forming a series in which ages are concerned, but to which human reason can assign no end or limit.

And here again we are carried on by a natural or necessary step to the connections of physical geography with the sciences of organization and life; testified not solely by the present forms of animal and vegetable existence on the earth, and by their influence on the state of its surface; but yet more remarkably by those vast calcareous, carbonaceous, and siliceous deposits, the *débris* of extinct life, which enter into the geological series, and record conditions of the globe, and lapses of intervening time, only to be understood by the history thus indelibly graven on the rocks. Such changes, reconverting into mineral form what has gone through the intermediate conditions of animal or vegetable life, have continued, though more partially, even to our own time on the earth. We still have before us coral islands and reefs, the workmanship of a wonderful instinct in the lowest forms of life; growing out of the ocean, and furnishing a future abode to man, and the higher types of animal existence. All these things and endless others in natural history—even down to the creation of *humus*, or earth-mould, by the simple organization of the earth-worm—are linked together through the researches of modern science, each illustrating, in its own part, the higher laws which guide and govern the whole.

But we must hasten on to other examples of the argument before us. And none is so prolific of illustration as the science to which we have just alluded, under the name of chemistry—a term, if nomenclature be of value, much too vague and general to express the mass of physical knowledge which is commonly comprised under this denomination. Here, indeed, we must recur to what we have before said of the inadequacy of the present classification and nomenclature of the physical sciences, to express their real and most important relations. Provisionally we may acquiesce in them, since our knowledge is far from being ripe enough for final change. But even intermediately we need some better definition and distribution of the vast and various objects to which the common name of chemistry is applied; such as may render more clear to the student, and even to the teacher, the relations which connect these parts together, and may best serve to the true and ultimate correlation of all. In one sense we may deal with chemistry as a group of sciences. If seeking more explicit description, we may define it as the science which has especial concern with the molecular states and relations of matter in all its forms;—with the affinities and proportions through which these relations are established;—and with the agents or forces which are present and active in all the changes so produced. Other definitions might be given; but none can omit this main point of atomical composition, and of the definite proportions, expressed even by numerical equivalents, under which these mutual molecular actions occur. This, which is the true substratum of what we call chemistry, has become likewise the foundation, directly or indirectly, of all other material sciences. And it is through this great common principle of molecular relations that chemistry has associated itself with or drawn them all within its own boundary.

We have spoken of *number* as an integral element in these relations. Had the mystical arithmetic of the Pythagoreans and Alexandrian Platonists been converted from a dreamy speculation into sober reality, it would scarcely have gone beyond the marvellous results which chemical analysis has disclosed; particularly those analyses of organic bodies, recording proportions and equivalents in number, weight,

and volume, which, in their exactness and completeness, may well be termed the mathematics of the science. The experimental researches by which these facts are attested —researches spread over every form and combination of matter, and worked into proof by synthesis as well as analysis—form one of the most wonderful pages in the history of human knowledge:—a volume, we might rather call it, not merely from the vastness of what it contains, but because it binds together, as we have said, all the great elements of physical knowledge. No condition of matter, simple or compound, is known or conceivable by us, otherwise than as an aggregation of parts, atoms, or molecules, from the mutual actions of which are produced all the phenomena of which our senses or reason inform us. Chemistry, therefore, in deciphering these actions, spreads itself as a science over the whole material world, and equally comprises within its scope the forces on which all such actions and changes depend. Thus defined, it strikingly illustrates, in every part, those connections of the physical sciences which it is our object to demonstrative.

But how are we to denote the force or forces, operating in these molecular changes of matter, to which we give the name of chemical action? Are there any peculiar properties or powers inherent in the atomic parts of bodies, giving them their several affinities and mutual relations? Or may we better attribute them to forces extraneous to matter itself; to electricity, heat, and light, more especially, under the several forms which these great agents assume in the natural world? The tendency of all recent science has been to establish the latter view, and to show that in every case of chemical action or change, one or other of these powers is present, either as the proximate cause of such change, or as evolved under some form in its progress. The universality of this fact, and yet more, the definite proportions and exact equivalents of parts which matter exhibits under their influence, go far to define them as the real agents in all chemical change;—a plurality of powers in expression; but so correlated and mutually convertible, that it seems as if science merely awaited some one further discovery to associate them together as a single source of power.

Chemistry furnishes endless examples of this exact relation of equivalents, between force acting and matter acted upon; and electrical science, especially, may almost be said to consist in the history of these relations. Every thing here is quantitative in the strictest sense. We evolve electric currents of definite intensity by chemical actions in which definite weights of matter undergo determinate changes. We convey the electricity so obtained through different media, producing in them changes of affinity, decomposition, and composition, ever in exact equivalents of volume or weight. The phenomena of electro-chemistry, first fairly disclosed by the genius of Davy, and the great law of electrolysis in definite proportions, which we owe to Faraday, have now become the centre of a new world of discovery. The magnetic needle, with its wonderful adjunct of the electric inductive coil,—capable of showing, by its deviations, the minute currents developed from the muscle of a frog's leg, or the muscular contractions of the human arm,—affords proof that no chemical action, however subtle, can occur without the evolution of electricity. There is much, though not equally certain, reason to believe, that electricity can never manifest itself but in conjunction with or appertaining to some mode of chemical action. Such is the close and widely pervading connection of all these great physical phenomena

Almost the same may be said of heat in its relation to chemical science. We can affirm it as probable, though not absolutely proved, that no molecular changes ever occur in bodies, whatever their nature or state, without some definite change of temperature. This is seen in the friction of simple solids; and still more strikingly in the recent experiments of Mr. Jowles, where, by strong and continuous mechanical agitation of the particles of water, the temperature of the fluid was raised to 160° Fahr. All chemical action in its essence is molecular change. And heat, like electricity, and ever in close relation with it, is an unceasing agent in decomposing or separating the material atoms of bodies, or in exalting the affinities which tend to unite them. Through chemical action also it may be said to be connected with, or even to create dynamical force, of which steam and other vapors furnish familiar examples; the more striking in the case of steam, from the exact proportion now determined between the degrees of temperature, and the amount of dynamical or motive power acquired. It is a

case of simple arithmetic applied to weigh and measure the operations of these mysterious powers of nature.

From heat we pass to the kindred element of light, as connected with chemical actions and affinities. Already we have seen how well this word kindred is justified, since even the beam which reaches us from the sun—seemingly simple, but concentrating within itself a world of wonderful phenomena—presents these powers in such relation to each other, that they are only dissevered by the different forms of matter on which they impinge. Until of late we knew the connection of light with chemistry chiefly or solely by its evolution in effect of, and during chemical changes. Now we know it as itself an agent in these changes, and an agent so working as to put to shame all the ruder manipulations of human art. Just twenty years have elapsed since photography, the science and application of the chemical action of light, came into existence. To fix what we transiently see by reflection from a mirror, was the object sought for. Earlier efforts had been made to attain it, but ineffectually. Once attained, every subsequent year has added to the marvellous beauty and perfection of an art, which may especially be called the child of science. Nor can we affirm that it has yet attained its maturity. Whoever gazes on the splendid colors in the solar spectrum, interblended, as they are, with the chemical rays, as well as those of heat, cannot but be seduced into thinking that photographic chemistry may hereafter afford coloring to our pictures, as well as the simple imagery of light and shade. Sir J. Herschel has already opened out this track of inquiry through the relation of complementary colors to that of the ground tint. In truth, we are still too scantily acquainted with the wondrous and complex machinery of the solar beam, to warrant abandonment of the object; even were it not probable that the phenomena of color are due in part to the atomical constitution of the bodies recipient of light, and to the organic structure of the eye itself, forming the last material link with the percipient being. This is, in fact, one of the cases, now frequent in science, where even failure may become a copious fountain of discovery. Negative conclusions have their value as well as positive ones; and we would fain hope that the argument we have pursued in this article, may be some index to the many collateral and connected results, which are sure to be derived from such inquiry. The recent photochemical researches of Bunsen and Roscoe are the best evidence both of what is yet to be learned, and of those admirable refinements of modern experiment, and the appliances of one science to another, through which this knowledge may be finally obtained.*

We cannot quit this curious topic of the relation of light to chemical actions, without briefly noticing other recent discoveries which connect this element with the internal conditions and changes of matter; not perhaps chemically, in the common use of the term, but in such way as to open a new avenue to those higher physical laws which may eventually bind together all these phenomena. We allude here to the researches of Becquerel on phosphorescent and fluorescent bodies; and, still more, to the experiments of St. Victor and Mr. Grove on the molecular impressions and changes produced by light and electricity. These researches, which might seem to give a sort of materiality to light, show it in its emission or *exode* from bodies into which it has been previously received; and in the case of phosphorescence and fluorescence, with time of retention alone as the element of distinction. We have room to notice one only of St. Victor's original experiments, which, however, will show the direction and value of these researches. An engraving is kept for some time in perfect darkness. Then one-half of it is exposed to strong sunshine, the other half still sheltered from all light. So prepared, it is taken into a dark room, and the whole surface placed in close proximity to a sheet of very sensitive photographic paper. That half of the engraving which has been exposed to light is reproduced on the paper,

* We have spoken above of the imperfection of our present knowledge of the physical properties of the solar light, as developed in the spectrum. Even since this article went to press, a memoir has appeared by Sir J. Herschel, having immediate relation to the curious phenomenon of *color-blindness*; but in which, with his wonted sagacity, he revises generally the intimate mutual relations of the prismatic colors, bringing some things into doubt, which have been hitherto held as elementary facts in the science; such, for example, as the relations of the yellow and blue, to the green, which has been always considered a resultant from them. The observations in this paper on the changes of color produced by *different degrees of illumination* have great value; as also the distinction, pressed upon the notice of the experimentalist, between the study of pigments or negative colors, and prismatic or positive ones.

while the half that has been screened produces no impression whatever. And further, an engraving exposed as before, and then placed in the dark upon white paper, conveys its impression to the latter, which again can transmit it to photographic paper. Any one accustomed to think on these matters will find in this single experiment a fertile germ of future discovery.

From the molecular changes of chemistry we pass by an easy step to that striking and beautiful symmetry of atoms, which crystallography brings before us;—a new science it may be termed, but already rich in discovery, and closely linked with every other branch of physical knowledge. Frequent and familiar though it is in all we see around us, symmetry, as a physical principle, has hitherto not been duly regarded. When we find that out of some three hundred and eighty mineral substances, nearly three hundred assume crystalline forms; and find, further, the same symmetrical tendency in the innumerable organic compounds of vegetable and animal life, it is clear that a great law lies at the bottom of the whole. The geometry of crystals we owe to Romé de Lisle, Haüy, Wollaston, Weiss, etc., being the first step in the science. Their chemical relations form a vast volume of facts, but all connected and embodied under common laws; while the special influences of light, heat, and electricity on the crystalline structure confirm what we have said of the correlation of these elemental forces, and of their action on the ultimate atoms of the bodies they penetrate and pervade. The numberless and beautiful phenomena connecting light with crystallography, dating from Huyghens, but suddenly and largely extended by the discovery of Malus in 1810, form in themselves a science, and one mathematical in its proofs. The connection of heat with crystallization is shown not solely in the influence of temperature on the act of crystallization, but also by the later researches of Mitscherlich and others in the alteration of actual crystals by heat;—in some, as regards the measure of their angles; in others, still more wonderfully attested by changes of internal molecular arrangement, without any alteration of external form. The relations of electricity, under its magnetic conditions, to crystallography, are not less striking; and they acquire further interest from being connected with the optic axes and with the various phenomena of light transmitted through crystals; as well as with that remarkable distinction between paramagnetic and diamagnetic bodies, which may still, perhaps, be counted among the unsolved problems of this science. The memoir of Faraday on the Magnetization of Light was the first inroad upon this great field of inquiry, in which he has so eminently since labored in conjunction with Plücker, Tyndall, and other philosophers. The controversies which have partially arisen out of this difficult research are, in effect, the best pledges for its future progress and ultimate success.

Examples such as those we have given to illustrate the connection of the physical sciences, crowd upon us from every side. But our space does not allow us to notice more than one other, already adverted to in part, and to which we now briefly recur. This is the physiology of animal and vegetable life;—a subject which, including even Man within its scope, assumes the highest place among the sciences, yet is so closely interwoven with all others, that we cannot stir a single step without reference to those phenomena of mutual action of matter and force which have just been under our consideration. The chemistry of organization and life is in itself a copious science, enlarged every day by new and more subtle research; and no longer limited to analysis, as in the earlier periods of organic chemistry, but carried by synthetical methods to the creation of various artificial compounds, identical with the products of animal and vegetable life. We have spoken before of the question, whether there be any, and what other powers, than those familiar to us in the inorganic world, concerned in the fabric and peculiar functions of living bodies; and to this question we are now, as before, forced to give an equivocal answer. We cannot detach or define any such independent power, or even conceive of it as a single force, seeing the many and incongruous actions it is required to fulfil. But neither can we, upon our present knowledge, assign these actions to any other power of which we have more certain experience. Electricity, heat, and light are all essential, in one degree or other, in the economy of life, or even to its very existence. Whether operating through chemical changes in the solids and fluids, or through the more mysterious functions of the nervous system, equally is their influence seen in the growth and decay of animal life, in the healthy and

diseased states of the living organization. But still we cannot affirm that any one of these forces is more than a minister or appendage to other powers of a different and more occult kind. Electricity, by the admirable experiments of Du Bois Raymond, Matteucci, and Helmholz, has been, more than any other of these forms of force, assimilated to that power which acts through the nerves and muscular organs. But we have no *experimentum crucis* on which to found an absolute conclusion of identity. Research in these secret places of science is occupied with effects so momentary, and quantities so inconceivably minute, that it requires subtlety both of hand and head, to obtain clear results, and to derive right inductions from them.

The latter remark applies equally to all that regards the action of light on living organisms. Recent inquiry shows this influence to be far more extensive and various, both in animal and vegetable life, than had before been supposed. As respects the latter, indeed, every day's familiar observation is an index of the fact;—simply but strikingly shown in that physical instinct (chiefly connected, if experiment says truly, with the indigo rays) by which plants bend themselves forcibly towards a stronger light, as if seeking to imbibe more of an element essential to their vigor and beauty. The observations of Decandolle, Liebig, Boussinghault, Hunt, etc., have carried this knowledge much further; associating with the action of light many of the most important chemical changes belonging to vegetable life, and notably those which pertain to the various coloring of plants and flowers. Even the different elements of the solar ray have been shown to possess different or unequal power over the vegetable processes. The actinic force, or that of the violet end of the spectrum, quickens germination much more than the luminous. Flowering and fruiting depend especially on the heating rays, as distinct from the luminous and actinic.

The influence of light on animal organization is less easily scrutinized. It appears most strongly marked in the lower parts of the animal kingdom; but ever subject to a certain ambiguity from the conjunction of heat with the luminous element of the solar ray. In man, it has been the general presumption that light finds ingress by the eye alone, and with the sole effect of giving direct and instant vision of things without. But recent inquiry calls upon us to recognize, even in the eye itself, the *retention*, and probably *reflex actions* of light, within the precincts of the organ; affording through what we may venture to describe as photographic impressions on the retina, the only plausible explanation of what have been termed its subjective functions; and of other phenomena, little heeded from their familiarity, but presenting problems of the highest interest to philosophy. The experiments of M. D'Arcy prove that the impression of light is often retained on the retina for fully two minutes and a half; a time, it may be remarked, in which a luminous particle or undulation might pass through thirty millions of miles of space! What is the condition of the light—be it conceived as matter, or motion, or force—when thus arrested and enchained in a living organization? In this brief question lies one of the most profound of the problems to which we have just adverted. And in this part of science, more especially, such questions are perpetually pressing upon us; each fresh fact (and the simplest are often the most prolific of results) giving access to objects of higher thought and speculation.

We might dilate endlessly on these topics;—but our space is exhausted, and our object, we hope, fulfilled, of showing the connection of the physical sciences, as it is established by recent research. It will be seen that these relations in themselves open out a new and wide field of discovery; intricate and obscure in many of its paths, but with fresh light continually breaking in to denote the true way, and with constant glimpses of a clearer and more spacious horizon in the distance. The laborers in this field are now more numerous than ever, the objects of inquiry better defined, and the methods and instruments of research more certain and complete. Happy those who can work tranquilly amidst these wonders of nature, animated by the love of science for its own sake, and undisturbed by the storms of war and political strife which are ever agitating and vexing the world without!

From The Saturday Review, 1 Oct.

THE NAVAL ARMAMENTS OF FRANCE.

DURING the last two months the emperor of the French has been occupying himself with the tranquil task of reducing his maritime forces. The news will perhaps startle some of those obstinately incredulous persons who have an odd way of solving the enigmas of Napoleonic policy by always reading imperial announcements backwards, or distorting them in some analogous fashion into a signification quite remote from their obvious meaning. But the good, honest, unsuspecting advocates of the French imperial alliance understand every thing as it is meant to be understood, and they know very well that the disarmament of France is all but completed; for is it not two months since it was announced in the *Moniteur*, and would it not be disgraceful to doubt the sincerity of an emperor who has always maintained the strictest fidelity to his engagements with England?

Of course, it is not to be expected that the details of the military proceedings of an absolute government should be published to the world with the minute, and rather tedious, accuracy with which the small doings at Woolwich and Portsmouth are chronicled in the daily papers; but still the very drowsiest believers in imperial integrity must feel a little astonished that no echo should have reached their ears from the dockyards whose whole available strength is being employed in landing cannon, dismantling transports, and laying frigates and firstrates up in ordinary in preparation for the long peace which the emperor has promised to Europe. Every administrative department works so smoothly and quietly under the absolute direction of a single will, that even the great work of reducing to a peace establishment the splendid fleets which lately threatened Venice, and overshadowed our own flag in the Mediterranean, has almost entirely escaped observation; and it is only by much patience in watching for the chance reports which turn up now and then in the news from France, that any idea can be obtained of the immense activity with which the process is being carried on. It must be confessed, too, that these scraps of intelligence admit of being perverted, by minds warped by suspicion, into indications of a warlike rather than a peaceful character; but right-minded persons will have no difficulty in comprehending that they afford striking examples of the simple faith with which the emperor invariably redeems his promises to the world. Notwithstanding Solferino, it is as true now as it ever was, that the empire is peace, and the laying down of new ships with improved apparatus for attack and defence is equally consistent with the magnanimous design of reducing the French navy to its accustomed limits. A candid and trusting spirit is really needed in order to see the pacific tendency of the fragments of news from Toulon, Cherbourg, and Brest which have recently appeared. The *Moniteur de la Flotte* mentioned, for example, about a fortnight ago, that great activity was being displayed in completing the two frigates, *Gloire* and *Invincible*, which are being sheathed with thick iron plates, and are to carry engines of nine hundred horse-power and armaments of forty rifled cannon. It might have been some set-off to this account to learn from the same source that very little was being done to the liners *Castiglione* and *Masséna*, if it had not been added that these ships might be considered finished. Then, a day or two later comes the news that two hundred thousand shells and thirty thousand rifles had been ordered for the use of the fleet, and that a new liner had been put upon the stocks, which is to be steel-plated, and to surpass in size the finest ships in the French navy. Her name, the *Magenta*, will always mark her as the symbol of the European peace which the emperor has conquered. The statements, under the same date, that the northern coasts of France are about to be armed with rifled ordnance, and that the mercantile steam navy has been overhauled to test its capacity for warlike purposes, are matters so clearly defensive and pacific that it is enough to refer to them without further comment. It is a little more startling to learn that, while the *Magenta* is being pushed on at Brest, a sister ship, the *Solferino*, is to be built at Cherbourg. We were long ago told that four other iron-cased ships were all but finished, and that the application of the same species of armor to some small gunboats had been tried with success; but it is only since the disarmament was proclaimed that orders have been given, and partly executed, for the construction, within eighteen months, of twenty steel-cased liners and fifty impregnable gun-boats. The same armor of defence is, it seems, being vigorously applied to coast fortifications on the Channel and the Mediterranean; and the last evidence of peaceful dispositions is an order for more rifled cannon to put Cherbourg at once upon a war footing.

These stray facts are the gleanings of little more than a week, but they may suffice to show how the emperor disarms his navy. It is impossible to misunderstand the meaning of these preparations. For many years the emperor had worked on steadily and silently to bring his navy up to the level of ours. Thanks to the infatuation of statesmen of all parties, the end was achieved, or all but achieved, before English jealousy was aroused

At last we began to bestir ourselves to recover some of our old superiority; and no sooner did the emperor discover that England was neither to be cajoled nor bullied into abandoning her naval policy than he openly accepted the implied challenge, and commenced a race of ship-building against us, with the avowed object of raising his fleet at least to an equality with ours. The motive for engaging in such a costly struggle can only be the contemplation of hostilities with England at some convenient season. And the consequence of the success of the emperor's efforts would simply be to reduce England at once to the position of a second-rate power.

Frenchmen see as clearly as ourselves—more clearly, indeed, than some among us—that it is impossible for England to submit to the loss of her naval supremacy, whatever may be the cost of maintaining it. It may be very unpleasant to be compelled to spend more and more each year upon an already sufficiently costly navy, but it is not a matter of choice at all. If France builds ships, it is a political necessity for us to build more ships. It is not a case for understandings and arrangements. We can no more maintain our position with a balance of naval power in the Channel than France could hold hers if her army was reduced to the scale of the little force which is encamped at Aldershott. France is struggling with all her energies to attain to equality upon the seas. For England such equality would be not merely real inferiority, but political annihilation, and perpetual danger. The thing cannot be. The race which has begun cannot be abandoned on our side. We must win it, at whatever cost. To the emperor it is but a matter of ambition. To us it is a question of life and death. It was a grievous error ever to let our fleet sink so low as to encourage the rivalry of France by the possibility of success, and it will be the cheapest and the safest course for England to put out at once her utmost strength, and convince the world that she cannot and will not have a rival on the seas.

To ask whether this is possible is simply to ask whether the part of England is played out. But no one who seriously compares the resources of the two countries can doubt that for every one of the steel monsters which Napoleon can launch we have the means to build a dozen. Wealth, machinery, engineering skill, are all on our side. The appliances which turn out scores of private steam-ships for every one which France produces are just as available for warlike purposes; and if the race between the two countries were run with equal determination, a single year would create a fleet on our side of the Channel which the emperor could scarcely match in ten. How many *Solferinos* and *Magentas* might not be built with the same expenditure of labor which has added the *Great Eastern* to the commercial fleet of England! One thing only is wanting to scatter all anxiety about the gigantic efforts which France is making, and that is, to know that the strength of England is being adequately put out. The inflexible will of one man is turning all the available resources of France into one channel. If he had thought that there was a chance that the will of England would be as vigorously and persistently exerted, Napoleon would never have attempted to vie with the resources which this country possesses for the construction of the vast iron machines which seem destined to supersede all other ships. But he has, perhaps rightly calculated that we shall not begin the race until he has reached the goal. To set against the four completed steel-clad liners of the French navy and the twenty huge monsters which are about to be constructed on a yet larger scale, we have one ship of the same description ordered to be launched in the course of next year. If the French experiment should fail, we shall save some expense by having waited for the result of a trial; but if it should prove successful, we shall be at the mercy of an invulnerable fleet which may be directed against our shores almost with impunity. This is not the sort of risk which is worth running for any amount of economy; and as the work will have to be undertaken at last, it would perhaps be as well to see to it without waiting till we have spent an interval of humiliation under the domination of a French fleet capable of defying any force which can be brought against it. With a neighbor so very rapid and decisive as Napoleon III., it is not prudent to sleep for an instant. We have let him get a long start of us in the introduction of rifled ordnance. He has had for years an organized system of manning his fleet, while our Admiralty seems content to have devised a questionable scheme on paper, and has made no effort to reduce to practice its projects for securing a permanent reserve. If the same system is still to be followed in the dockyards, we shall perhaps have just laid the keels of a magnificent steel-cased fleet by the time that a score of unassailable French ships are convoying up the Channel an army of Zouaves eager once more to make war for an idea. Some little ground may have been gained upon the French during the last year; but if it is to be kept and to be improved, the Board of Admiralty must learn to imitate the promptitude of their imperial rival. As yet there are no signs that they have begun to appreciate the inestimable value of time.

From The Press, 1 Oct.

WHOM IS FRANCE AFRAID OF?

EVERY day's report from Paris informs us of new and formidable defences being erected all along the seaboard of France. What can suggest so needless an expenditure of francs, and so elaborate, extended, and rapid a defence of coast? Russia has no idea of making a descent on that country. She is hard at work on railroads, serf-emancipation, and other inland material and moral transformations, which alike absorb her attention and her available resources; and if she be occupied with ideas of territorial aggrandizement, it is to the east, and not to the west, that her regard is directed. America has plenty of space for expansion without making a grasp at France. Besides, her practical and dollar-loving people are the very last and least likely on earth to spend money on a Quixotic crusade, in which they "calculate" they would have the worst of it. Austria has no fleet, no funds, and no means of raising them; and beaten on land, where she is strong, she is very unlikely to try her luck at sea, where she is hopelessly feeble. Spain it would be absurd to name. Holland has a small fleet, and a few sailors and no ambition. What, then, does France mean by raising batteries on every salient point of her coast—with iron plates turning on pivots, that allow the guns to be pointed in every direction—and, finally, by arming Cherbourg *en guerre*, with rifled cannon and on complete war footing? It looks to us as if folly or fanaticism or deep hostile designs were the inspiration of so vast a preparation. There is only one country whose fleet holds the supremacy of the seas, equal to cope with any three fleets in Europe —our own England. But she has not hinted a hostile feeling toward France. She has no more desire or design to attack France by sea or land than she has to attack America. The sentiments of her people, the policy of her rulers of all shades of politics, the necessities of her trade, the unpopularity of war taxes, are all hostile to a quarrel with France, and favorable to the deepening and strengthening of that alliance which is popular even where it is somewhat distrusted. The French emperor is well aware of this. He knows that no English ministry dare propose a war with France on any pretext whatever. Aggressive war has not an advocate in our country, and the emperor knows it. We are, therefore, driven to the conclusion that the emperor is foolishly squandering the national treasury on purposeless, useless, and supererogatory works, or that some fanatical and unfounded terror has stricken his nerves, or that he is carrying out a deep and vast design in the direction of the *idées Napoliennes*, the upshot of which will be an invasion of England. Which of the three alternative solutions is most probably the true one, we must leave our readers to decide, and that strange and perplexed future which is opening before us to evolve.

From the Economist, 1 Oct.

AUSTRIA AND THE NATIONAL PARTY IN GERMANY.

THE DUKE OF SAXE-COBURG.

THE liberal party in England feel, not without reason, the strongest political antipathy to Austria. We see that her rule over foreign races and over her own children has been identified with every political iniquity, and that while Austria exists, the unity of the German people and the political sympathy of Germany with constitutional freedom must remain a mere idea. We see that Austria is the mischievous link which unites the freer intellect of the Teutonic race with the barbaric despotism of the east and the spiritual despotism of the south of Europe. We see that were her influence to decay, Prussian freedom and civilization would take a sudden and enormous stride, and soon spread over the whole area peopled by the Teutonic race. And hence we cannot but look with impatience and disgust at a power whose tenacity of life and conservatism of purpose stand in the way of Europe's hopes, and spread political desolation quite beyond the border of the Western world, ruling even Slavonians and Magyars in a spirit less enlightened than their own.

But when we are absorbed in this view of Austria, we do not catch the principles even of the most liberal among the German Constitutionalists. Duke Ernest, of Saxe-Coburg-Gotha, is one of the most advanced of the "national" party in Germany. He has long seen the necessity of a more complete unity amongst the many little principalities into which Germany is unhappily decomposed; he has long been prepared for personal sacrifices in order to cement that unity. In 1848, and again when the project of German unity was revived a year or two later, he was one of the first to come forward with the offer of a personal self-sacrifice in the common cause; and only recently he has incurred the bitter displeasure of Austria by receiving and warmly encouraging a deputation of Federal reformers, whose object it was to revise the principles of the German Federation, and by putting Prussia at the head of the German Union, and consolidating and extending the Federal law so as to give the League a less equivocal claim on the military aid of the smaller states, to throw the whole weight of Germany into the scale of constitutionalism and religious liberty, and so erect a solid bulwark against the encroachments of either imperial despotisms, or the ultramontane Romanism.

So hearty is Duke Ernest of Saxe-Coburg in the Federal cause of Prussia as rightful head of the new German Confederation, that the anger of the Austrian Foreign Minister is fully excited, and in a note, just published, addressed to the Austrian Minister in Saxony, Count Rechberg begs him to remind the duke of Saxe-Coburg that "the lamentable errors of this same party, handed over Germany not very long since to great commotion and to the danger of civil war, a danger from which she was not saved by narrow-minded and short-sighted constitutional doctrines, but by the noble German sentiments of our emperor and master, and by the moderation and love of peace of the two great German powers."

We are not concerned at present to discuss the question at issue between the Duke of Saxe-Coburg and Austria, or to canvass the claims of Prussia to head the German Federation. This is scarcely an open question in England. Even the most conservative of our politicians would prefer Prussia to Austria, and would see more hope for Germany in the deposition of the latter in favor of the former, than in any other possible political event. But what it is instructive for us to note is, that the Duke of Saxe-Coburg himself, though a vehement partisan of Prussia, and as severe a critic of Austrian policy as it would be easy to find in Europe, takes a view, — possibly not entirely without support amongst his royal English relatives,—of the relations between Austria and Germany on the one side, and Austria and France on the other, as different as possible from that which is prevalent among the English Liberals. And this view it is well for us to understand as being bound up very closely with the real national feeling and steadfast constitutional sympathies of a great part of Northern Germany.

The best exposition we can find of this view is given in a pamphlet universally attributed in Germany to the Duke of Saxe-Coburg, which was published two or three months ago, before the last act of the Italian war. Its authorship has never, we believe, been denied, though the name of the duke has been openly connected with it; its principles, too, are in exact accordance with those recently professed by Duke Ernest, and so vehemently vilified by Count Rechberg. And yet to an Englishman the pamphlet reads in many parts like an apology for Austria, or, at all events, an elaborate argument for the necessity, on the part of the most liberal and Protestant of German States, of casting in their lot with hers, as against France and Sardinia, and saving for her, at all events, in Italy "the line of the Mincio." What can be the considerations which induce liberal and for the most part Protestant Germany to regard "Austria, with her concordat and her priests," as after all so essential to the safety of the German Confederation? It is obviously the fear that any blow which should finally undermine the power of the Austrian government would set free numerous loose atoms of alien nationality,—unfit for independent self-government,—which must inevitably fall into the attracting sphere of either Russia or France, and so bring into the closest contact with the weak national life of Germany, strongly centralized despotisms devoted to political propagandism If Austrian power were once really paralyzed, Bohemia, Galicia, Servia, Croatia, Transylvania, Hungary, all on the borders of Germany, and with a joint population almost equal to that of the German States themselves, would all be cut adrift from any single centre of government, and be likely to fall an easy prey to the first strong candidate for their allegiance, who in most of these cases would be Russia. Then, at the same time, all barriers between Germany and the Ottoman empire, itself bound together by a mere loose rope of sand, would be struck down,—and for the *disjecta membra* of that once powerful body no doubt France would be a chief competitor. Thus Germany would find herself on all sides more and more closely neighbored by formidable and highly centralized governments, with a passion for extension and conquest, and with the greatest advantages against her own feebly-organized states. This is a danger that the liberal and constitutional party may well dread, and it is the danger which makes them dread so much any dissolution of that highly artificial unity called the Austrian empire. They know well that wherever the carcass is the eagles will be gathered together, and Germany is not in a position to court the approaches either of the eastern or the western despotism: the insults of Napoleonic France are still fresh in her memory; and her recent humiliations at the hands of Russian diplomacy are scarcely likely to fall into forgetfulness when such notes as that of Prince Gortchakoff to the German courts are an every year's occurrence. Hence we cannot wonder to find the principal representative of the reforming or Prussian party in Germany wholly opposed to the Italian cause, simply because he regards it as the cause, not of Italy, but of France,—and wishes to sustain Austria against France in Italy. "The Austrian empire," says the pamphlet which we have mentioned as the Duke of Saxe-Coburg's, "contains a number of races which hate one another, and would quickly be at one another's throats were the government overthrown. Although these races are not fit to govern themselves, if the iron bond in which Austria constrains them were broken, it would be easy for the revolu-

tionary despot in France to set them one against the other, and so in the end to subdue them all. He shares this wish and its profits with the revolutionary power of eastern Europe—with Russia, who no less than himself wishes to see Austria broken into fragments."

But, besides this external reason for dreading Russia and France, the liberal party in Germany regard, with far greater fear of political *contagion* than is possible to us in England, those imperial despotisms in which the educated middle class is deprived of all its proper political influence. They rightly look to that as the only true guarantee of political freedom for Germany, and they justly think that the French and Russian political organizations tend more to create a contempt for sober middle-class governments, and to cherish the modes of thought which bring them into disrepute, than the clumsy Austrian tyranny can ever effect. For strong despotic executives inspire a sort of admiration and exert a kind of fascination absolutely fatal to constitutional modes of thought. It is but too much the fashion in Germany to feel and express a certain nervous respect for this sort of political strength, alien as it is to the genius of the German people. And here again, as well as in the reasons which render the French and Russian governments natural objects of fear to Germany, in connection with the loose elements of the Austrian empire, lies a principal secret of the dislike felt by the constitutional liberals for any European policy,—however seemingly favorable to liberty,—which threatens to increase the European influence of France and Russia. If, therefore, the Duke of Saxe-Coburg takes a view of Italian politics utterly and strangely at variance with the view taken by English liberals and constitutionalists,—instead of railing at the party which he represents as feeble and inconsistent, it may be well to remember that Germany is exposed to many dangers, and rightly biassed by many considerations which can hardly be adequately realized by English politicians.

From The Spectator, 17 Sept.

THE GERMAN MOVEMENT FOR UNITY.

THE short Napoleonic campaign in Upper Italy has had the curious double result, of rousing two races at the same time to a feeling of their weakness and to a desire for unity. Loud is the voice of orators and legislators at Florence, Parma, and Modena, for a strengthening of the bands of Italian nationality by means of immediate annexation to Sardinia; but nearly as loud, if not as enthusiastic, is the appeal of German politicians from the smaller States of the Confederation for an annexation to Prussia. These latter political symptoms, feeble at first, have within the last few weeks been increasing in strength and importance to a considerable degree, and it is highly probable that they will soon take proportions such as may occasion another change in the political configuration of Europe. As we said a few weeks ago,* "a twofold political movement has been going on during the last half century among the Teutonic races—a movement for greater liberty, and a movement for greater unity of government;" and it was now the one and now the other which prevailed in directing the course of public opinion. In latter times, however, the desire for unity has become by far the stronger of these two tendencies, showing itself in numerous manifestations of popular feeling; but it was not until sanguinary battles were fought on the plains of Lombardy, and the national feelings of the Italians were roused to the highest pitch, that the same feeling of race also began to awaken in renewed strength in Germany. The victorious career of the French army, while on the one side it raised the highest hopes, engendered on the other the highest fears. If it were possible for the Emperor Napoleon to sweep, in two months, an Austrian force of near two hundred thousand men from the soil south of the Alps, what might he not accomplish if the fancy should take him to repeat the like thing north of the same mountains; a field far more accessible for him in a strategical point of view, and attainable in half the space of time. So reasoned the politicians of Germany, and they rose to a man to communicate their fears to the nation.

The first result of this communication was a congress of party leaders from different states of the Confederation, which assembled on the 14th of August, at the little town of Eisenach, in Thuringia, a place situated very nearly in the centre of Germany. Several resolutions were drawn up at this congress, all expressive of the feeling of the present political helplessness of their country and of the earnest desire to remedy this state of things. But then came the great question as to the best means of remedying it. Long and earnest were the debates on this point, but at last it was unanimously decided that the only safe rallying stand for the German nation would be Prussia. All opinions and considerations duly weighed, it was felt that of the two poles between which the desire for German unity had been hitherto vibrating, Austria and Prussia, the former had been too often tried, and too often found wanting to be trusted again, and that, therefore, all hopes now rested in the latter. This decision once settled, it was forthwith embodied in a kind of manifesto, "The Declaration of Eisenach" (*Die Eisenacher Erklärung*), which was sent about for

* *Spectator*, August 27, p. 880.

signature to the leading men of the different states of the Confederation. According to the latest reports, gathered from the *Augsburg Gazette* (a paper, by the by, very unfavorable to Prussia, and the acknowledged partisan of Austria), this declaration has been endorsed by six hundred and twenty-five names, all without exception those of eminent men, and not a few of them of European fame. It is highly instructive to peruse this list, so as to see the quota which each of the different States of the Confederation has furnished to it. Taken in alphabetical order, we find that the following is the result: from Baden 19, Bavaria 25, Brunswick 11, Frankfort 8, Hamburg 8, Hesse-Darmstadt 33, Hesse-Kassel 168, Lübeck 54, Prussia 182, Saxony (kingdom of) 15, Saxe-Coburg 5, Saxe-Gotha 26, Saxe-Meiningen 17, Saxe-Weimar 54. There is not a single name from Austria, none from Hanover, and none from Würtemberg, which are very noteworthy facts as far as the negative side of this list is concerned. As regards the positive, it is certainly the most important manifestation of public opinion which Germany has given since the stormy days of 1849, when the representatives of the nation at Frankfort offered the ancient crown of the empire to the king of Prussia.

The Eisenach Declaration, it must be well understood, in order to appreciate so comparatively small number of signatures, was expressly drawn up for the affirmation only of the leading political men of the different states, so to say the élite of Germany. Other manifestoes, of a similar nature, but all uniting in the main point of the first document, the union of Germany *through* Prussia, originated at the same time in many of the other states of the Confederation, and in a few weeks were endorsed with many hundred thousands of signatures. Some of these latter local manifestoes indeed are very interesting publications, evincing in their precise formulation not a little degree of political knowledge. For example, at Bremen, a town which through its commerce with England has imbibed much of the self-reliant spirit of the British race, a document was agreed on and largely signed, which sets forth more clearly than any other we have yet seen, the actual demands of the reformers. The following are the four points in this Bremen manifesto, exhibiting the wishes of the national party. First, a representation of the German people, and not as hitherto of the German princes only, at the seat of the central government; secondly, a union of the whole of the military powers of the nation in the hands of Prussia; thirdly, a temporal absolute rule of the same power, in case of urgent necessity; and, fourthly, an extension, on liberal terms, of the boundaries of the Zollverein, over the whole of Germany. All this, it is added in the declaration, can and must be gained by reform, and not by revolution; and the signitaries promise that it will be gained as soon as the whole nation shall rise like one man to make the demand. That such will happen in a time not far distant, the originators of these addresses seem to be confident; and to judge by the tone of four-fifths of the German press, it indeed appears as if they have great reason to be so.

There can be very little doubt, in fact, that the German nation, in its vast majority, would be but too happy to gain the political concessions demanded by the Eisenach and other declarations; but this once conceded, there arises the new question, how far the princes will be willing to give up their sovereign rights in favor of reform. In this respect the Germans are certainly worse off than the Italians in their movement for national unity, for not merely are they blessed with many more rulers, but they have not as yet succeeded in getting completely rid of a single duke or grand duke. Hitherto only one sovereign, whose possessions are small in geographical extent, Ernest II. of Saxe-Coburg-Gotha, brother to our prince consort, has expressed his willingness to vacate the throne, in case of urgent necessity, in favor of Prussia; but all the rest of the petty sovereigns are evidently looking with any thing but a favorable eye on the movement of the reformers. That they do not openly interfere with the movement is a fact which rather shows their own weakness and the strength and depth of the public feeling, than any sympathy on their part. Perhaps, also, it is not very unnatural that this should be so, seeing that in this agitation their very existence is at stake, and to a high degree. But what is more surprising is that even the Prussian Government, in whose whole favor the movement evidently turns, shows itself in an unmistakable manner opposed. The prince regent of Prussia, and indeed the rest of the members of the royal house of Hohenzollern, have not as yet given one friendly answer to the many addresses in favor of German unity, which have reached them from all corners of Germany; and the official and semi-official papers of Berlin do every thing in their power to damp, if not to ridicule, the ardor of the reformers. This strange behavior on the part of the members of the Prussian Government can only be explained in one way: they mistrust the movement; and, in spite of the protestations of loyal subjects that "reform, not revolution" is wanted, they fancy that they see the red flag of the republic behind the Black-Red-and-Gold of the men of Eisenach.

In this very unfortunate mistake Prussia is

at present greatly encouraged by Austria, who in the frailty and evident falseness of her actual position, promising on the one hand and threatening on the other, would have not the least influence on public opinion, were it not for manœuvres like these. The principle of "Divide et impera," the ancient motto of the house of Hapsburg, is in this case also doing good service, and with its help the movement for German unity will probably be checked for a little while in its course. But there is little doubt that ultimately the national feeling will triumph, for in labor as it has been for more than half a century, its strength now is such that it can well defy the opposition of princes, as well as their fatal want of determination.

From The Economist, 24 Sept.

ENGLISH POLICY IN THE EAST.

THERE is nothing like the arrogance with which Englishmen are disposed to treat the great Oriental nations. The English press has begun to feel its responsibility towards continental Europe, and no longer speaks of foreigners and foreign politics with the ignorant and dictatorial tone of the last generation. In the case of Europe we do at last know at all events enough to see the error of judging the whole Western world by our domestic institutions and standards of thought. But we still treat the ancient civilizations of India and China much as they affect to treat us. "We cannot allow large territories of the world," said an able and thoughtful contemporary last week, "to be kept waste by the perverse exclusiveness of a sort of moral vermin. It is obvious, then, that our position in China, and that of other civilized races, must be reconsidered with a view to the most merciful treatment of that unhappy nation, but also to the safety of our countrymen and the peaceful march of commerce. . . . The laws of our intercourse ought to be settled by agreement between the civilized powers who are interested, and enforced with humane firmness upon the helpless Mongols." The equanimity with which English counsellors contemplate the responsibility of "enforcing with humane firmness" a respectful demeanor on a population of three hundred and sixty millions of "moral vermin," seems to us a startling proof of the indistinctness and inadequacy with which the magnitude of these vast Eastern problems is grasped by English imaginations. It is not enough that we govern after a very inadequate fashion two hundred millions of Hindoos, whose intercourse with us is, on the whole, marked by any thing but frank and agreeable incidents. We are advised in more than one quarter, with scarcely less sense of responsibility than would be appropriate in commenting on our treatment of the Indian tribes of the Hudson's-Bay territory, to come to an understanding with the other commercial nations of the west as to the best restrictions to impose on this empire ten times as populous as France, and then pledge ourselves to enforce them "with humane firmness upon the *helpless* Mongols."

We have seen how Englishmen, in their quiet rooms, thinking rather of the discussion at English breakfast tables the next day than of the practical aspect of their advice, regard the impracticable Chinese. Now, let us look for a moment how acute Chinese, looking not to a "reading public," but to the sentence which will be recorded by the "vermilion pencil"* on their despatches, regard the impracticable English. "The barbarians," says a paper found in Yeh's archives at Canton after the capture of that city, which is printed in Lord Elgin's recently issued blue-book, and approved by the "vermilion pencil," "must be dealt with justly of course, and their feelings thus appealed to, but to keep them in hand, stratagem (or diplomacy) is requisite. In some instances a direction must be given them, but without explanation of the reason why. . . . With people so uncivilized as they are, so blindly unintelligent in styles and modes of address, a tenacity of forms in official correspondence such as would duly place the superior above and the inferior below would be the cause of a fierce altercation (*lit.* a rising of the tongue and a blistering of the lips); the only course in that case would be to affect to be deaf to it; personal intercourse would then become impossible, and not only this, but an incompatibility of relations would immediately follow, of any thing but advantage certainly to the essential question of conciliation. Instead, therefore, of a contest about unsubstantial names which can produce no tangible result, it has been held better to disregard these minor details in order to the success of an important policy." The sublime condescension and pity of this curious document, ludicrous though it be, when judged by the practical conclusion it recommends, namely, a policy of concession, on points of form, to the barbarians, contrasts not disadvantageously with that arrogant advice tendered to our statesmen to enforce our own terms with "humane firmness" on the "helpless Mongols." English self-esteem is apt to give and take,—with only too little thought of the problem before it, physical or moral,—advice which, for its one-sidedness of view and recklessness of assumption, would probably have brought down the bitter censure of

* The emperor of China's remarks are all said to be written with the "vermilion pencil."

the "vermilion pencil" had any Chinese mandarin ventured to submit it to the "sacred intelligence."

Seriously speaking, it is no affected humility, but the dictate of the plainest common sense and the most ordinary modesty, to distrust both our right and our power to force certain vast external changes of habit and manner, at the point of the bayonet, on the dense populations of the east. We are not in the least aware of the eventual issues which this strange revolution brought about under the force of external dictation may produce, —whether it would be desirable or not, in case we had the power to effect it; and that we have this power there is still more doubt. We know little of our Indian subjects, and nothing of the Chinese. We mark with pure amazement the style of their literature, and the currents of their moral interests. We do not either understand, or wish to understand. We regard their forms of speech and action as so much unintelligible trifling which Providence has mysteriously permitted for twenty centuries, but which we are summoned to put an end to. True, such unintelligible modes of thought and life are ingrained in the very souls of much more than half the inhabitants of the earth. But why on that account should we respect them? Why not rather show how much more truly we respect their tea and their rice and their cotton, than the prejudices and convictions they have been so unfortunate as to inherit? At all events, we act on the assumption that, in order to make the eastern nations value our thoughts, we must show our complete indifference to theirs; and even beat them into outward conformity with the western manners.

Lord Elgin has well remarked in one of his able despatches to Lord Malmesbury (and the remark is certainly rather too quietly than too emphatically expressed), that "The doctrine that every Chinaman is a knave and manageable only by bullying and bravado, like the kindred doctrine that every trading junk carries guns and is piratical, is, I venture with all deference to think, sometimes pushed a little too far in our dealings with this people." If we may judge by the tone of English public opinion on the present crisis in the East, the warning given is not only timely, but only just in time. And unless we wish to justify the Chinese maxim, that "The long river is the bound prescribed by Heaven: to bring a foreign race to dwell hard by, is to ensure calamity in the time to come," we must admit different principles into our conduct from those to which we have as yet been accustomed.

In the remarks we have here made we should be very sorry if it should be supposed that we are prepared to pronounce our countrymen in the wrong in the recent disastrous proceeding at the Peiho. The despatch of Admiral Hope, which appeared last Saturday, leaves us still without the proper data for a decision. He tells us that the mandarins at Tien-tsin replied to his communication "evasively," but we are not enabled to judge for ourselves how far the evasiveness went, or whether it contained any proof of bad faith. On this head, therefore, we cannot give any further opinion; and our present remarks are intended not to furnish any apology for the Chinese, but to record our emphatic protest against a false and arrogant tone of dictatorial ignorance which is growing up in England with regard to Oriental States, and which is far more likely to endanger seriously the British empire in India than even the British ports or commerce in China. We shake off all the moral shackles which limit our national intercourse with European nations, on the ground that the Chinese and Hindoos understand only the display of force and regard scrupulous equity as conscious weakness. We take up no new restraints in the place of these shackles, but assert our superiority to the local customs and scruples even more decisively than to those which we ourselves, in the case of European policy, should delight to observe. The consequence is, that our policy is only too apt to become simply unscrupulous. We cannot afford, we say, to obey our own standard of right in places where it is not recognized or even appreciated. We can still less afford to adopt the barbarous or artificially degraded standard of right acknowledged by the nations with whom we deal. Consequently, we limit ourselves by none at all, but simply do, without compunction, what we think best calculated to attain our ends. This is a most corrupting and dangerous system. In removing all the finer influences from political relations, it tends to undermine our own respect for them, and certainly to undermine any respect entertained for us by these civilized barbarians. They see that we do not judge by their standards. They see no standard of our own adopted in its place. No wonder they say that "As a general rule, the outer barbarians trade because their nature is so covetous;" and that they think themselves justified in any evasion, however unscrupulous, of so selfish an assailant.

Lastly, we would note that this policy is not even successful. The Americans read us a good lesson in their far quieter and less ostentatious, and on that very account more effective diplomacy. Whether it be true or not, as is stated, that the American ambassador succeeded the other day in reaching Pekin when we failed, simply because he did not excite jealousy by an attitude of menace,—it is certain that this policy has often before been

successful when ours has failed. We cannot better sum up what we wish to enforce than in the words of an admirable letter written from Shanghai to the editor of the (French) *Patrie*, on the recent catastrophe at the Peiho. They are words which deserve to be weighed well by English statesmen. "With regard to England . . . she is too practical not too reflect seriously on the lesson of the Peiho, and not to admit that, if an outrage calls for reparation, and if such reparation is due to her, her own interests demand the application of as much prudence as firmness. If from an exaggerated national sentiment, as I think it, England should not think it necessary to introduce into her future relations with China some modification of her old mode of action, she may expose herself to the danger of provoking such isolated re-awakenings as this of the Pe-tchili, and thus, ever on the dangerous and uncertain declivity of a serious war with a country of three hundred millions of inhabitants, she may compromise, together with her own cause, that of Christianity and civilization."

From The Economist, 1 Oct.

THE CHINESE POLICY.

WE have much reason to hope that a new war with China is not the inevitable necessity which some of our contemporaries represent it. The more we hear of the circumstances which led to the disaster at the Peiho, the more likely it seems that unjustifiable imprudence and impatience on the part of our own ambassador are chargeable with at least as much of the disastrous result as any disloyalty on the part of the Chinese. The act of aggression against a country with which there was peace, confessedly came from us; and the only question that can arise is, how far it was fairly provoked by indications of deliberate bad faith on the part of the Chinese. No convincing proof of such bad faith has by any means been produced. Some evidence there is that, by a little patience, Mr. Bruce might have attained his object without any indignity —at least if we may trust the account given in the *Pays* of the American ambassador's (Mr. Ward's) success in reaching Pekin, and of his expected interview with the emperor. No doubt, if that account be trustworthy, Mr. Ward was rather smuggled into Pekin than allowed to enter it in state. The sedan-chair, or closed vehicle, whatever it was, in which the Chinese are usually carried about, was in his case so closed in as to prevent his getting any glimpse of surrounding objects, and in his residence at Pekin itself he appears to be secluded jealously from all general access to the outer world. Otherwise it is said that he is courteously treated, and will be allowed to exchange the ratification of the treaty with the emperor in person. The Chinese seem, therefore, to have no intention of breaking faith with the American government, and if we may trust the report of the late disaster copied into the *China Mail* from the Chinese handbills themselves, the Chinese never intended to break faith with us, but only to prevent the intrusion of an English force into the Peiho.

"The following," says the *China Mail*, "is an accurate translation of the account which the placard gives, in Chinese, of the fight:—

"'NEWS FROM TIEN-TSIN.—The barbarians started from Shanghai on the 15th day of the 5th moon, and on arrival communicated with Senn Wang (Prince Senn), and allowed him three days to take away the wooden and iron obstacles in the river, and he answered that they must stay in the outer ocean until the Commissioners, Kwei-liang and Hwa-shana, arrived at Pekin, when they would be invited to go to Pekin. The barbarians were not willing to agree to these terms.'"

Now this may be a complete misrepresentation of what really occurred, but if so, why have not Mr. Bruce's own despatches, which must set the thing in the true light, been published by the government? How the matter is regarded by some of the English on the spot, the following remarks in the *Overland China Mail* sufficiently show: "Sooner or later the truth must come out in regard to China, that the foreigners there have chiefly their own stupidity to blame for the hostility of the Chinese. Kiy-ing, the most faithful and intelligent friend of our interests in China, was compelled to commit suicide by the imperial court, because—and we make the charge with pain—he was so slighted and set aside by Lord Elgin's mission that the imperial court was led to believe he had been deceiving it as to his knowledge of, and interest with, the foreigners. Kwei-liang and Hwa-shana were so slighted by Mr. Bruce refusing to see them at Shanghai, that Prince Senn-ko-lin-sin, the head of the war party, was rsised to influence."

Now, if this be any thing like a true version of the whole transaction, how' little evidence is there of any deliberate bad faith on the part of the Chinese. The two Chinese commissioners, Kwei-liang and Hwa-shana, expressly destined to receive the British embassy, were at Shanghai; there, Mr. Bruce refused to see them, fearing, we suppose, some desire on their part to evade a proper introduction of himself and his suite to Pekin. The slight annoys and perhaps alarms the Chinese government, who fear the repetition of Lord Elgin's feat last year in the Peiho—a feat, we must remember, proper enough while

the two countries were at war, and England was demanding reparation, but not equally suitable when they were at peace and the English ambassador was on his way to ratify the peace. As we well knew—as Lord Elgin knew before his return home—the government of Pekin had taken great pains to restore the forts knocked down at the entrance to the Peiho; and if it be true that the Chinese commissioners at Shanghai considered themselves slighted, it is natural that the anti-English party at Pekin should gain enough influence to secure the thorough reinforcement of the forts, and perhaps to render the whole tone towards the English embassy less courteous than it would otherwise have been. When Mr. Bruce arrives at the Peiho, he is told that the Chinese commissioners appointed to receive him have not yet come, and that while expecting their coming he must not enter the Peiho, the navigation of which is forbidden. The same intimations seem to have been made to Mr. Ward, the American envoy, and to have induced him to enter a different arm of the river, where he was received by the Chinese officials. Mr. Bruce, however, insists on entering with his retinue the main avenue to Pekin,—and declines to wait for the commissioners' return from Shanghai, or for any thing else, and on the admiral's attempt to carry the forts, the repulse in which we have suffered so heavily occurs.

We say again that this may be a very untrue account of the proceedings, but if so, why are not Mr. Bruce's official accounts produced? Why are we not fully informed of the circumstances of the treachery from which our countrymen have suffered? Admiral Hope's despatches are quite consistent with the account we have given. He speaks of an "evasive" letter from the authorities at Tientsin which he does not give; and if it be true that Mr. Ward has been received after any fashion at Pekin, the only difference appears to be that he yielded to the "evasive" intimations of the Chinese authorities as to the mode of his reception, while the English and French Envoys insisted on being received in their own way.

We sincerely hope that the government, in replying to the Chinese despatches, have withheld their approval of the course pursued by our envoy, and have not chosen to regard the loss inflicted upon us as in itself a *casus belli*. That they will authorize the reinforcement of our troops there, is a matter of course. It is essential that we should not be defeated, or supposed to be defeated, by mere force. But unless the government have kept back from the English public—which is in itself very unlikely—details proving the guilt of the Chinese in the matter, we do not think it at all probable that they have authorized a declaration of war on the strength of what has happened.

From the necessity for a war we still hope to be saved. And we think it possible, moreover, that we may gain a permanently useful lesson, as to our treatment of China, from the failure of what, on present appearances, we must call the high-handed and arrogant method of diplomacy which Mr. Bruce has adopted. We have no wish to exaggerate the error, if it be, as we believe, an error, which our envoy has made. We do not compare his policy to the attempt to send Lord Cowley up the Seine amidst an escort of English gun-boats. No doubt the difference between the cases is very great. But we do maintain that the habit of treating the Chinese exceptionally, as a barbarous nation, which ought to be forced into a more gentle demeanor by a little wholesome pressure, is quite inconsistent with the expectation that they will treat us with all the courtesy and candor of Europeans. What we sow, that we must reap. If we think it necessary to provide means of overawing a government that is at peace with us into a fulfilment of their engagements, we must not complain if they provide means of overawing us into acquiescence in the strict letter of their engagements. If we have so little confidence in them, that we enforce a treaty with a train of gun-boats that were not in the covenant, we must not be surprised if they provide against the uncovenanted gun-boats by well-armed forts that are also not in the covenant. It may be true that we have many excuses for a display of force on such an occasion, which we should not have as against any European nation; but if so, it is to just the same extent true that the Chinese have excuses for military precaution against our display of force, which they would not have against any nation that treated them by a European code of etiquette. All the allowances that may be made for Mr. Bruce's procedure, tell equally strongly for Senn-ko-lin-sin's procedure,—which is, as it were, the reflex of the former.

From The Athenæum.

Sparks from a Locomotive; or, Life and Liberty in Europe. By the author of "Belle Brittan's Letters." New York: Derby & Jackson; London: Low & Co.

A YOUNG English lady in a public car—that is, a railway-carriage on a northern line—called Col. Fuller a "foreigner." The epithet, as Col. Fuller complains, is a sad one. Yet it has advantages. A foreign eye is a fresh eye. Your rough old salt is not the man to note "the green abounding beauty" of the sea, or catch the mysterious voices "moaning for the sleep that never comes." Men who live on Alpine heights are not keenly alive to that beauty of the sunrise which hurries the tourist up the Rhigi and the Alpen horn. Every thing grows trite by daily use. Hence the peculiar charm we feel in going over familiar scenes with a friend to whom they are strange; the revival of novelty in our own sensations; the springing of beauty in points on which we no longer dwelt; the subtleties of character, the harmonies of outline and color, which the worn eye may have ceased to note.

To us, a foreigner has many uses. He brings us news; not merely on his tongue, but in his gait, his speech, his manners; and not only of himself, but, to a certain extent, even of *ourselves*. In his courtesy—his manliness—his integrity—we read something safe and final about the institutions under which he may have grown. In the mirror of his mind we may also behold an image of ourselves—often an extraordinary, sometimes a very ugly vision. Yet we like to see it. A plain woman loves to consult her glass. A sturdy Briton, though his opinion of himself and his country may be wisely humble, is sometimes in the mood to catch an "intelligent foreigner" by the button, and make him confess all that he may please to think about us and our ways of life.

Col. Fuller, whose "sparks" fly about like fire from a house, rather than down like those from a locomotive, is an excellent witness, shrewd, good-natured, witty, full of experience, yet wholly new to our peculiar world. His run through England—and, indeed, through Europe—was at railway speed, allowing no time for the greenness to wear off. Trained to the pen, he dashed down what he saw with the hurry and the brightness of a sun-picture.

Our visitor came to England in the Asia. On the very first day of the voyage, "on the removal of the cloth, George Francis Train, Esq., one of the liveliest, wittiest, and best-tempered of men, proposed that the company present should resolve themselves into a mutual-admiration society." This led to the institution of a daily paper on board—the articles of which were published with the nuts and claret. All the talents seemed to spring up at a word of demand:—"Not only was every man of our company a singer, an orator, and a wit, but a poet and a journalist as well. Lord Bury contributed a story, entitled the 'Posthumous Papers of Dr. Blanco,' not surpassed by any similar production of Dickens. Train gave us volumes of statistics, and poetry by the yard; while a young man on board, by the name of Burns, a clerk in the New York house of Morton, Grinnell & Co., threw off gems in rhyme worthy of his great namesake." Bravo! The Asiatic Lottery—the name of this daily paper, from *Asia*, the vessel, *Lott*, the captain thereof—was disposed of at the end of the voyage by raffle, and, being won by a lady, was given to Lord Bury, "to whose facile and felicitous pen the *Asiatic Lottery* is indebted for its most brilliant gems."

Col. Fuller stepped into the hospitalities of Mr. M'Henry, of Liverpool. The first Englishman met in England gives our witness a favorable impression of English enterprise and success. Mr. M'Henry "is one of the largest financial operators in Europe," but his genius is capable of small things as of great. "In the midst of his more gigantic schemes, Mr. M'Henry is projecting a mammoth hotel in Liverpool on the American plan; a water-cure establishment in Wales; and has, within a few days, purchased the *London Spectator* (formerly edited by the great Sam Johnson), and placed Mr. Thornton Hunt, son of Leigh Hunt, in the editorial chair.

Col. Fuller went to Great Malvern for the waters, and to the Burns dinner at Dumfries for the whiskey. The first he praises, and at the second he was praised. He made a good speech, which we have read over again in his book, as well as all the kindly things said after dinner in welcome of the American guest. A train carried him from Dumfries to Edinburgh, the city of monuments:—

"Among them all, none has impressed me so pleasantly as the monument to Sir Walter

Scott. This exquisite inspiration of art has afforded me a new sensation. It leaps into the air like a flame, and lifts the imagination up with it. The form is a gothic pyramid, two hundred feet high, designed by Kemp, a self-taught architect, and it covers, like a pointed cap, a colossal statue, in a sitting posture, of the king of novelists. The likeness is admirable, and the expression indicates all the noble attributes of genius so happily blended in the character and in the creations of Scott. It is a pleasant fact to record that the last £1,500 required for the completion of the Scott monument was raised by the efforts of the greatest living poet of Scotland—Charles Mackay—who, when the work halted for the lack of the above-named sum, addressed letters to all the leading authors in Great Britain, soliciting funds for the purpose; and soon succeeded in raising the amount. The letters received by Dr. Mackay in answer to his appeal, have been carefully preserved by him in a book, which is one of the rarest volumes of autographs I have ever seen."

Col. Fuller expresses an opinion on the trial of Madeline Smith:—

"Drive on, to the College of Justice in Parliament Square, and gaze mutely and intently at the venerable old pile. And what says my red-haired guide? Nothing of Jeffrey, of Blair, of Forbes, of Dundas, or of Melville; but—'there, sir, is where Madeline Smith had her nine days' trial!' In this little modern tragedy all the ancient gloom and glory of the place is forgotten. But I confess that the mention of the fact gave a new interest to these ancient halls. I had read every word of that famous trial; and had fully acquitted the fair and beautiful prisoner of murder; for if she did *not* kill the contemptible villain who threatened to *murder her reputation*, by proclaiming his own shameful triumph over her frailty, she hardly did her duty to herself or to her sex."

Americans generally have strong opinions on the question of the "subjugation of woman by man." We were not aware that any of them went so far as the dogma of "Poisoning no Murder"—when it is done to prevent scandal. At length the visitor reaches London:—

"The distances are truly magnificent; and, between such extremes as Peabody's Banking House in 'the city,' and Lord Bury's mansion in 'Belgravia,' one begins to get some idea of the immensity of the town; but it is not until after driving through a continuous, compact street, or series of streets, to the distance of *sixteen miles*, that we have a 'reaazng sense' of the expansive limits of London."

The first thought of a Republican is to see the queen. The wise Greeks had the same curiosity. Col. Fuller goes to the opening of Parliament—the Parliament of the present year—and here is his picture of the scene:—

"What a pageant of splendor and of grandeur was here presented! The floor of the house was packed with the wives and daughters and sisters of the peers, in full dress, leaving only a narrow space in the centre, which was occupied by peers and bishops in their brilliant scarlet robes. The entire gallery which surrounds the House was filled with a row of elegantly dressed ladies, only broken by a line of reporters occupying seats directly opposite the throne. Behind the reporters, the benches one rising above another, were filled with ladies. Presently the trumpets sound—the signal that the queen is approaching. She leaves the palace in her magnificent state carriage drawn by eight cream-colored horses, attended by her ministers and household officers, in carriages but a little less sumptuous than her own; escorted by the Life Guards, all mounted on noble black horses; the whole *cortège* forming a most magnificent spectacle. In alighting from the carriage, Her Majesty's foot presses an electric wire, which fires a cannon in the Park. The Usher of the Golden Rod gives a signal; and, suddenly, every lady in the House throws off her opera cloak or shawl or mantle; and a more beautiful revelation can hardly be imagined surely not described.

"Flashed all their arms in air;
Flashed all their bosoms bare,
Stunning the gazers there—
Lovely six hundred!"

Now for the queen!—

"The queen enters, arrayed in her most royal robes, with a glittering tiara of diamonds on her head; while the crown of England is borne on a velvet cushion behind her. She ascends the throne, which looks like a great golden chair, elevated three or four steps; and as soon as the two maids of honor have adjusted her long train of crimson velvet, takes her seat, looking every inch a queen. Another gentle silken sound, and everybody is seated, while the silence is profound. Ten minutes elapse in waiting for the members of the House of Commons, who come tumbling in at the opposite end of the hall, and as soon as silence is restored—and such silence I never before heard (for it is almost audible)—the queen took her speech from the hand of the Lord Chamberlain, who stood by her side, and read it in a very deliberate, distinct tone of voice—and, as Shakspeare says, 'with good emphasis and discretion.' Not a word was lost; and, when she had finished, she ap-

pea red to me ten times as majestical as before she began. Her voice is very pleasant, and her intonation showed that she understood and meant what she uttered. But it sounded odd to hear that little woman talk so supremely of her power, her authority, her army, her navy, her ministers, her people, etc., etc. And yet there was a touch of the 'moral sublime' in the dramatic situation of the scene—in the palpable evidences of the surrounding 'divinity which doth hedge a *queen*.'"

Col. Fuller is severe on the Prince Consort, and, indeed, generally on the *men*. His delight is evidently in the "bosoms bare" of the "lovely six hundred." For instance, at Hampton Court, he turns with a shrug from grisly saints and martyrs hairy to the sweet picture of—Nell Gwynn:—

"The room in which I lingered longest and left most reluctantly, was the one principally devoted to Sir Peter Lely's beauties of the Court of Charles. His women surpass any thing I have ever seen on canvas; and his Nell Gwynn (as the Duchess of St. Albans, bearing a remarkable resemblance to the beautiful Mrs. L——, of New York), haunts me like a dream. There is a light in her eye; a sweetness in her lip; a smile on her face; and a fountain of inspiration in her fair, full bosom, to melt the heart of an anchorite. I have never seen but one lovelier vision, and *that*, blessed be the Divine Artist, is a breathing, living, loving 'statue of flesh!'"

The harder sex is much less to his mind; and even in the historical crowd at an opening day, his fancy wanders fondly back to the lovely six hundred:—

"The great men of England, who were present on the august occasion, did not particularly impress me as men of great personal dignity and power. I saw no head as massive as Webster's, as noble as Clay's, or as striking as Calhoun's. Among the peers, Lord Derby looked most like a leader; but among the bishops, I saw no very marked evidences of divine or human 'authority;' and, as for the Duke of Cambridge, the military head of the army, no phrenologist would select him from a crowd as one 'born to command.' But the ladies of the nobility are decidedly better looking than their lords. I have never before seen so large a collection of fine, fresh, rosy-looking women. The majority have fair complexions, blue eyes, exuberant busts, and luxuriant heads of hair. On coming out of the House of Lords, the crowd was very great, and progress was very slow; but it afforded a fine opportunity of a daylight look into the faces and eyes of the leading belles of England; and although there was danger of being smothered in a crowd of peeresses, yet I suppose it would have been like the 'dying of a rose in aromatic pain.'"

Of the beauty of our English roses the gallant American never wearies. Of course, he is writing for a New York audience; and fair readers on this side of the great deep may like to hear what a clever writer thinks it necessary to insist on with his countrywomen in such delicate matter of comparison. Listen:—

"I find it no uncommon thing in England to meet 'unprotected females' in the cars, and the higher the social position of the ladies the greater is their simplicity of dress and affability of manner. So far as health, comfort, and fitness are concerned, the American ladies have much to learn from the English, especially in their travelling costume. We see no finery or frippery here in the railway carriage; and silks and satins in the streets are apt to excite rather uncomplimentary suspicions of the wearers. The 'Balmoral' is almost universally worn; and even fiery red stockings are by no means uncommon. Long dresses are never seen out of drawing-rooms, and there they are worn both long and low. The English women have magnificently exuberant busts; and they 'don't care who knows it.' Full dress, for dinner or the theatre, consists in 'low neck and short sleeves,' and this is observed *de rigueur*; while all gentlemen are expected to appear in black dress coats and unimpeachable gloves. At the Theatre Royal, in Liverpool, the other evening, I was about entering the boxes with a lady on my arm, who wore on the back of her head a little 'love of a bonnet,' about the size of a japonica flower, when she was arrested by an usher, who politely informed her that the forbidden bonnet must be left in the anteroom."

There is one drawback to his delight—or would be, if the colonel were a Chinaman, which we are thankful he is *not*. The busts are divinely beautiful—how about the feet? Look, ladies, to your balmorals:—

"I have seen but one pretty foot in England. I used to think the old nursery story about the 'old woman who lived in a shoe, entirely fabulous; but since I have seen the pedestals of some of these lovely, living female statues I have formed a more favorable opinion of the veracity of 'Mother Goose.' But it is very evident that a large foot is not considered a detriment to female beauty in England; as the ladies make no effort to diminish the size of their feet by wearing pinching slippers. On the contrary, they wear clumsy

gaiters, with heavy soles, which make their steps any thing but fairylike. And in this they show their good sense. One half of the consumption cases among the American women are owing to wafer-soled shoes, which render walking both difficult and dangerous. And so they sit pining in satin chairs in their over-heated rooms, sucking cough candy, and waiting for the doctor, and his shadow the undertaker; while these buxom English beauties are tramping about in their water-proof boots, or darting through lanes and parks in their saddles. To appear delicate or lackadaisical is no part of an English woman's ambition. Health and vigor of body are considered of primary importance, not only for comfort's sake, but as the most essential qualifications for satisfactorily and successfully performing the duties of wives and mothers. And they dress and eat and exercise accordingly. On calling on Lady —— the other morning, one of the most beautiful and accomplished ladies in London, I found her dressed in a plain, purple colored woollen robe, made of cheap and coarse material, and yet so tastefully fitting her fine figure that I was struck with the elegance and comfort of the *ensemble*. An ultra fashionable belle of the Fifth Avenue would hardly 'come down' to her visitor in so simple a costume; or if she did, it would be with a confusion of apologetic words and blushes."

It is wise in our gallant critic not to let that "one pretty foot" out of its slipper. The advice given or implied is, however, of the kindest and best.

Col. Fuller dines at clubs, dances at Casinos, visits famous people, and rattles off his opinions about the wine at one, the loveliness at another, and the talk at the third. One of his rapid visits—that to Leigh Hunt—gains, from the death of the "famous personage," a momentary interest of a peculiar kind. The brief passage on it we transfer to our columns, as a note to the memoir given in another page:—

"On entering the little parlor used as a 'study,' a tall figure, dressed in a morning gown, with a large cape, came forward and grasped my hand with a sort of feminine tenderness and enthusiasm, and said, 'I am glad to welcome a gentleman who has spoken such hearty words for Burns.' Tea was soon ordered; and for two delightful hours I sat listening to the fluent and unflagging talk of the contemporary, the companion, and the friend of Byron, Keats, Coleridge, Wordsworth, Southey, Lamb, Moore, Campbell, and all the men of wit and wisdom whose stars have sparkled and vanished in the literary galaxy of England during the last fifty years. Leigh Hunt is now nearly eighty years of age; and yet his complexion has the fairness and softness of youth. His hair is as white as the bloom of the almond-tree, and as full and glossy as the head of a child. His brow is broad and beautiful, and his eye as gentle and as clear as that of a woman who has never seen a cloudy day. His heart is as merry as a bird's, and his look and manner alternately playful and pensive, but without a shadow of sadness. The dear old man, with all his precious poetic memories—with his venerable juvenility—this genial octogenarian, this unfading rose in the snow—how like he seemed to his own glorious 'Abou Ben Adhem,' that sweet essence of all religion distilled into a single drop; and which by the way, as the author has kindly sent it to me, written in his own beautiful hand, I will here quote, although it may be already familiar to every schoolboy in America:—

"'Abou Ben Adhem (may his tribe increase!)
Awoke one night from a deep dream of peace,
And saw within the moonlight in his room,
Making it rich, and, like a lily in bloom,
An angel, writing in a book of gold.
Exceeding peace had made Ben Adhem bold;
And to the presence in the room he said:
"What writest thou?" The vision raised its head,
And, with a look, made of all sweet accord,
Answered, "The names of those that love the Lord."
"And is mine one?" said Abou. "Nay, not so,"
Replied the angel. Abou spoke more low,
But cheerily still, and said, "I pray thee, then,
Write me as one who loves his fellow-men."
"'The angel wrote, and vanished. The next night
It came again with a great wakening light,
And show'd the names whom love of God had bless'd,
And lo! Ben Adhem's name led all the rest.'

"The poet has a copy of his favorite gem, exquisitely written and illuminated by Miss Procter (daughter of Barry Cornwall), handsomely framed, and hung near his writing-table. I shall not attempt to repeat the many wise words, admirable criticisms, and pleasant personal anecdotes with which he instructed and entertained me; but a capital illustration of Wordsworth was too good to be lost. 'He was a fine lettuce, with *too many outside leaves!*' Of Byron, he spoke with great sympathy and admiration; of the unfavorable maternal influences that warped his budding genius; and of the schoolboy sneers at his lameness, which irritated his temper. But added that he was neither habitually moody nor morose, 'usually humming about in the morning, and reserving his

more serious compositions for the night.' 'In Byron,' said Mr. Hunt, 'there was a conflict of jealousy which the world never fully understood. *The Lord was jealous of the Poet; and the Poet was jealous of the Lord.*' Of Burns and the old Scotch poets, Mr. Hunt talked in a strain of ardent and eloquent admiration, quoting with great glee:—

"'Our gude man cam' hame at e'en,
And hame cam' he.'

The idea of 'buttons on blankets' seemed to amuse him infinitely. On leaving, the good old poet-essayist presented me with a copy of his latest work, 'The Town.'"

After Col. Fuller's return from France and Italy—into which countries we need not accompany him—he reviews the Old World relatively:—

"After the Continent, England looks grander and richer and more substantial than ever. The very earth seems firmer, and the men and women look more solid, more earnest, more worthy of immortality. If it is evening with the human race in Italy, and morning in America, surely it is high noon in England. With the sun on the meridian, the shadows disappear."

With this pretty compliment we close a book which we have read through, amused and pleased. It would be difficult not to part in good humor with a guest so much delighted with England and the English as Col. Fuller.

THE PAPAL CONTROVERSY.—The Bishop of Orleans having spoken very harshly in his late circular of M. About's book on Rome, that writer has now replied, accusing the bishop of going beyond his attributions in speaking of politics: Formerly, he says, the pastoral letter of a bishop was a little episcopal gazette, speaking of eggs and butter and cheese, and, in fact, of what might or might not be eaten in time of Lent. You transform it into a political journal, without paying any thing to the stamp office, or furnishing any caution money. Defended by your sacred character against the severity of the correctional police, you declare war on your former sovereign, the king of Sardinia. You do not either pay much respect to the government which has transformed you from a Savoyard into a Frenchman, from a priest into a bishop, and gives you a salary to serve it. You post up your diatribes on walls belonging to the state; you get them read in the pulpit by public functionaries, supported by the state; and the prince who has just accorded an amnesty to his vanquished and discouraged enemies designs to leave an appearance of triumph to your little insurrection. You had two strong reasons for remaining silent, since you were born under the Sardinian sceptre and live in the French empire. Can it be possible that the ecclesiastical habit has freed you from your two legitimate sovereigns, so as to allow you to subject yourself to a petty foreign prince?

DUST FLOATING IN THE AIR.—M. Pouchet finds that the dust floating in the air contains the *detritus* of the mineral constituents of the globe, atoms of animals and plants, and the finest debris of all the materials we make use of. But one item he especially points out; viz., Wheat starch, which is invariably found in dust, whether old or recent. Surprised at the quantity of it present among the aerial corpuscles, M. Pouchet investigated the dust of all ages and of every locality; and everywhere he found this wheat starch present. "I have found the starch," he says, "in the most inaccessible corners of old Gothic churches, mixed with dust blackened by six or eight centuries of existence; I have found it in the palaces and cans of the Thebiad, where it may have dated from the time of the Pharaohs; I have found it in the tympanic cavity of the ear of a mummified dog, which I had found in a subterranean temple of Upper Egypt. In all countries, in a word, where wheat forms the staple of food, starch always penetrates into the dust, and is met with in greater or less quantities.—*Medical Times.*

A PERFECT LAWYER.—An English writer of the seventeenth century has given a sketch of "the character of a perfect lawyer." The concluding sentence of the eulogy, is as follows:—In a word, whilst he lives, he is the delight of the court, the ornament of the bar, the glory of his profession, the patron of innocence, the upholder of right, the scourge of oppression, the terror of deceit, and the oracle of his country; and when death calls him to the bar of Heaven by a *habeas corpus cum causus*, he finds the judge his advocate, nonsuits the Devil, obtains a *liberate* from all infirmities, and continues still one of the long robes in glory.